THE Journal

OF THE AMERICAN DENTAL ASSOCIATION

MAY

1958

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NINETY-NINTH ANNUAL SESSION

VOLUME 56
NUMBER 5

DALLAS, TEXAS • NOVEMBER 10-13

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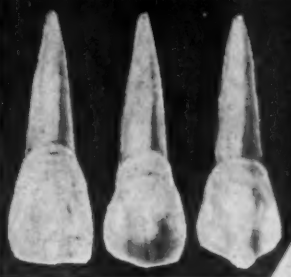

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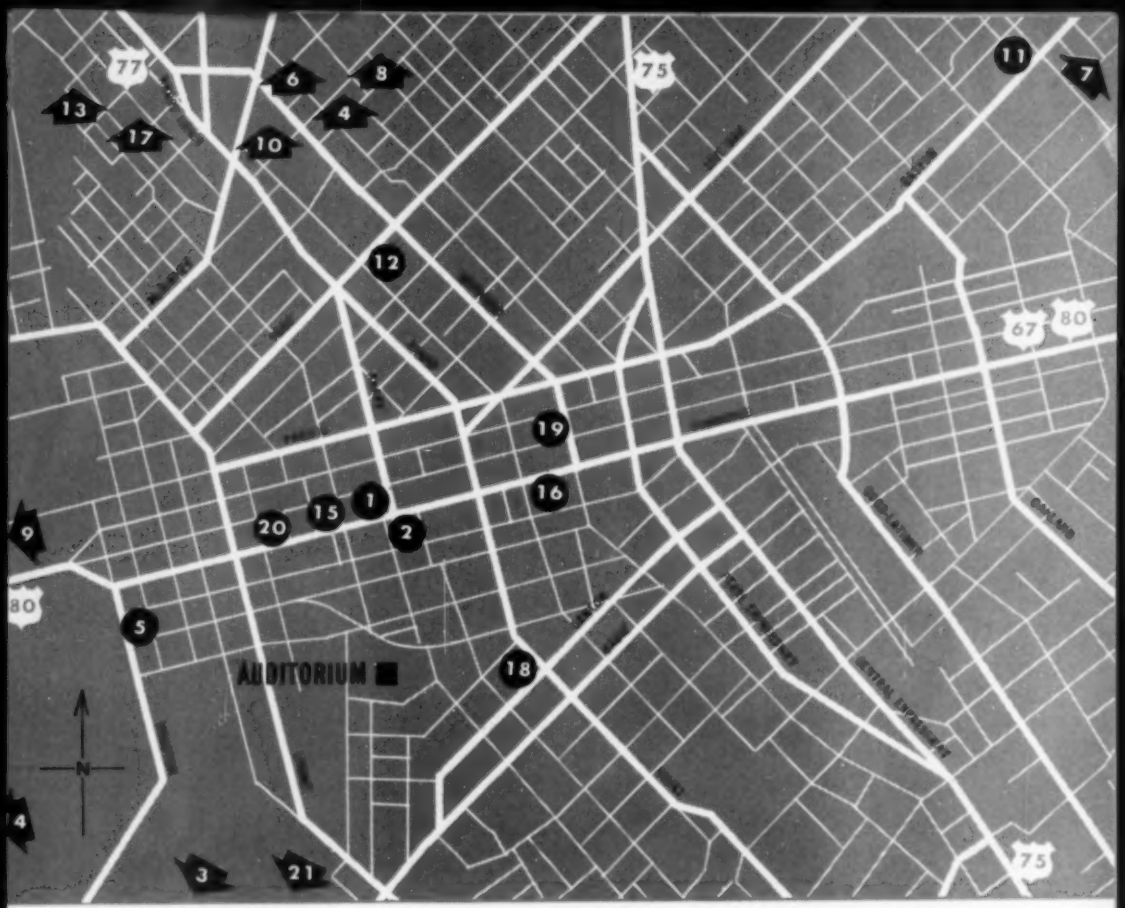

MAP OF DOWNTOWN DALLAS, TEXAS

HOTELS

	HOTELS	SINGLE	DOUBLE
1.	*Adolphus	$5.00-14.00	$8.50-15.00
2.	*Baker	5.00-11.00	7.00-14.00
3.	Cliff Towers	4.00- 5.50	5.50- 8.00
4.	Crest Park	6.00-12.00	8.00-15.00
5.	*Dallas	5.00- 8.00	6.00-12.50
6.	Highlander	9.00	12.00
7.	Lakewood	4.50 -5.50	6.00- 8.00
8.	Lawn	4.50- 5.50	6.00- 8.00
9.	Lennox	5.00	7.00- 7.50
10.	Loma Alto	4.50- 5.50	6.00- 7.00
11.	Lynn	5.00- 6.00	6.50- 8.00
12.	*Mayfair	5.00	6.00- 8.00
13.	Melrose	7.00-10.00	9.00-12.00
14.	Miramar	4.50- 5.00	6.50- 8.50
15.	*Southland	4.50- 8.50	5.50-13.50
16.	*Statler-Hilton	7.00-14.00	10.00-18.00
	Headquarters hotel—special application form required		
17.	Stoneleigh		8.00-11.00
18.	*Travis	5.50- 9.00	8.00- 9.00
19.	*White Plaza	5.00- 8.00	5.50-12.00
20.	*Whitmore	5.00- 6.00	6.00- 8.00
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Belmont Motor Hotel	U.S. 80 West (Business Rt.)
Colonial Motor Lodge	State 183 N. W.
Coronado Motel	U.S. 80 West (Business Rt.)
Dallasite Motor Hotel	U.S. 75 North
Eastern Hills Motor Ct.	U.S. 67 East
El Sombrero Motor Ct.	U.S. 77 N.W.
4-Winds Motel	U.S. 77 N.W.
Lang Motel	State 78 N.E.
Lido Motel	U.S. 67 & 80 East
Last Frontier Motel	U.S. 80 West
Oaks Manor	U.S. 75 South
Palomino Motel	U.S. 80 West
Paramount Courts	U.S. 80 West
Shangri-La Court	U.S. 80 West
Shamrock Motel	U.S. 67 & 80 East at Loop 12
Skyline Motel	U.S. 77 N.W.
Texas Motel	U.S. 80 West
Town House	U.S. 77 N.W.
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When "Breakfast Anorexia" must be Overcome

Anorexia upon arising must often be dealt with as part of a therapeutic regimen. In addition to the well-known syndrome of early pregnancy, several other causes of "breakfast anorexia" are recognized. Generally psychological in character, they include fear or lack of enthusiasm in facing the day, distaste or intolerance for the fried and fatty foods commonly served at breakfast, and habit patterns such as late rising with the inevitable morning rush. Obese patients who "cannot" eat breakfast tend to overeat during the day in order to overcome the deficit.

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DENTAL AUTHORITIES

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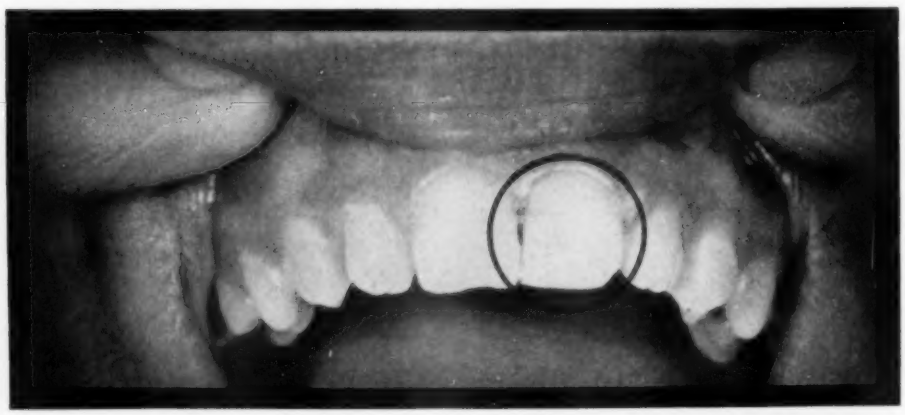

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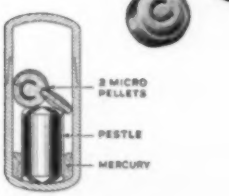

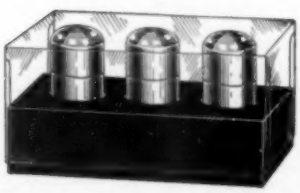

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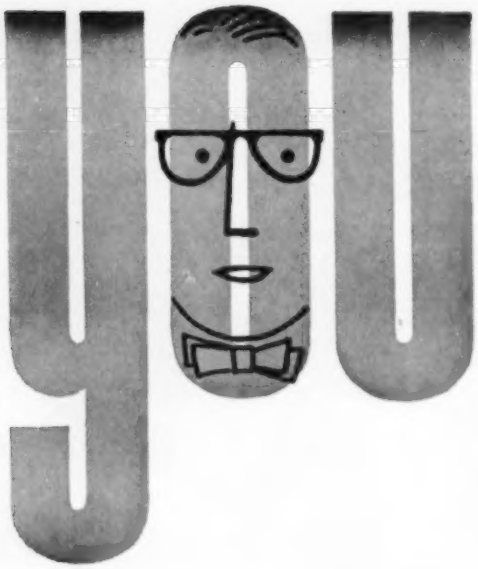

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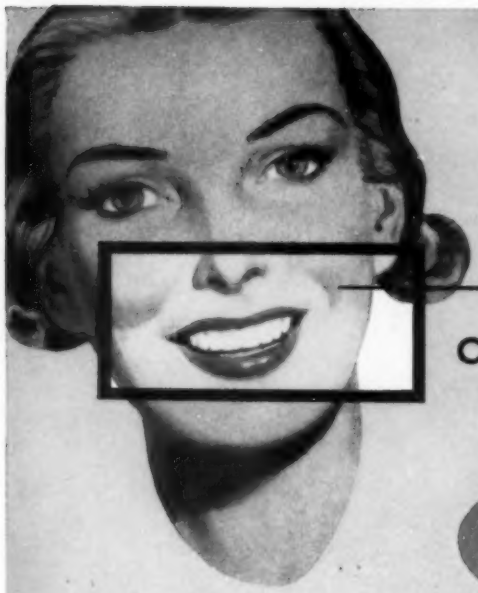

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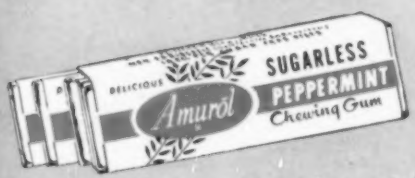

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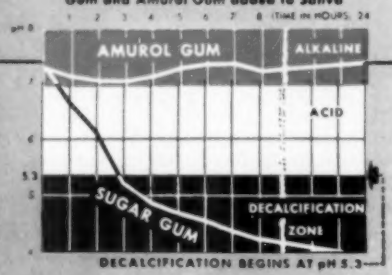

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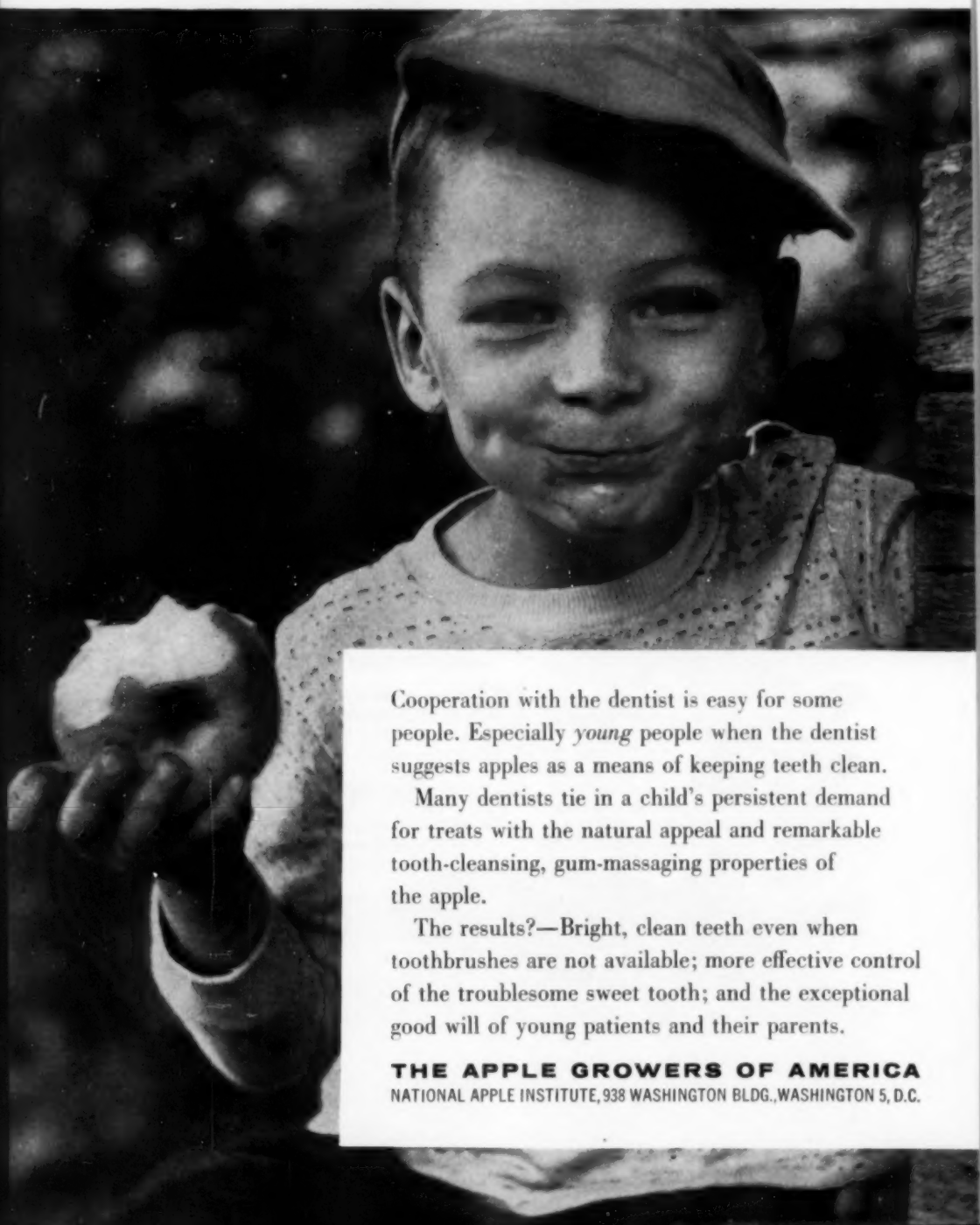
Picture of a young man

COOPERATING



Cooperation with the dentist is easy for some people. Especially *young* people when the dentist suggests apples as a means of keeping teeth clean.

Many dentists tie in a child's persistent demand for treats with the natural appeal and remarkable tooth-cleansing, gum-massaging properties of the apple.

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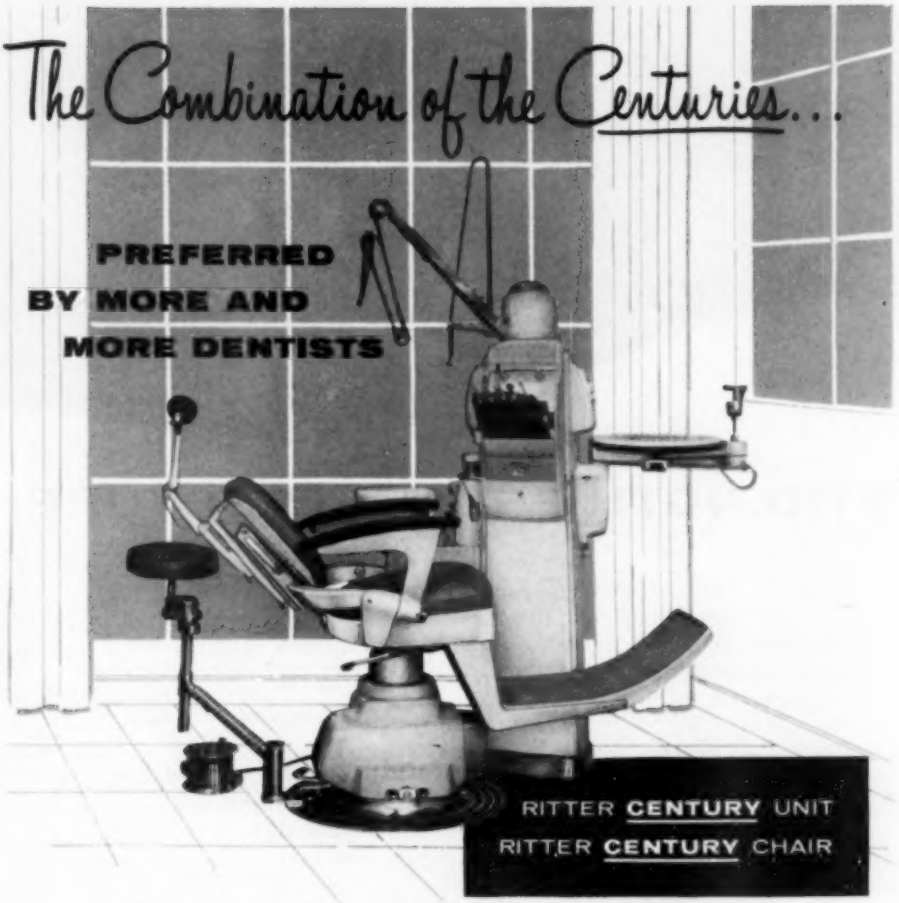

Dentists agree that successful practices result from a combination of skills *and* fine equipment. That's why more and more dentists prefer the dependability, operating ease and modern styling of *the two Centuries*. . .

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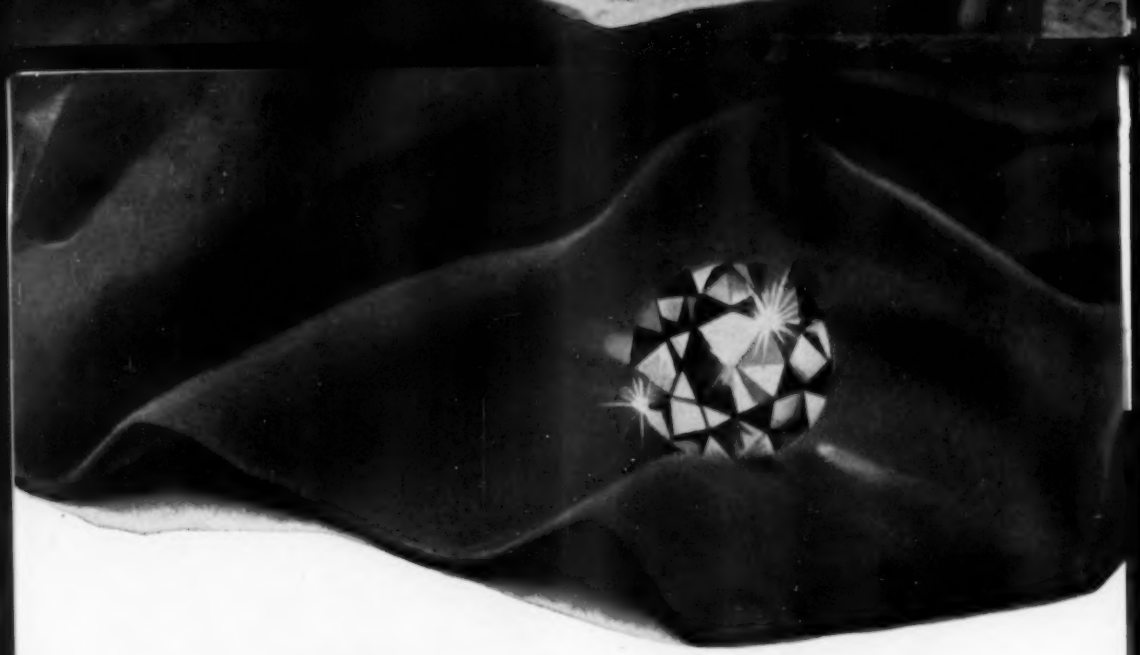

STRENGTH FROM STRUCTURE

Although we usually think of pure, crystalized carbon as a decorative gem, the diamond is also widely used for industrial cutting and grinding purposes because of its hardness . . . a prime example of strength from structure.

A natural tooth also has built-in strength and beauty, thanks to its internal structure, and man-made teeth should be fabricated from a material with a similar internal structure, if the denture patient is to realize maximum functional and esthetic benefits.

Trubyte Bioform meets this specification! Almost all of the air has been removed in the exclusive Trubyte Bioform vacuum firing process, providing a smooth, dense, homogeneous porcelain which has much of the strength—and is blended to simulate the optical vitality—of healthy natural teeth.

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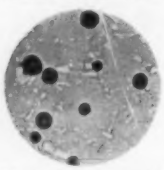

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Review of 1957 dental research

The Council on Dental Research is grateful for the many favorable comments received after the publication of the 1955 and 1956 reviews. The Council now presents research reviews for 1957. It is through research that progress is made, because someone is dissatisfied with things as they are. Westinghouse developed the air brakes because he was thoroughly dissatisfied with the hand brakes. Simply stated, research is nothing more than the application of scientific principles to the study of a problem or phenomenon.

The annual review of selected areas of original investigations is prepared and published so as to provide the total membership of the American Dental Association with brief and concise statements regarding the latest developments in the respective fields. From year to year areas of dental science are chosen which we believe will be of interest to clinicians and therefore enable them to utilize the latest scientific developments in rendering service to their patients. The Council is cognizant of the importance of a well-informed membership as well as the limited amount of reading time available to busy practitioners. However, it is the practitioners who are in closest contact with the general public and therefore enjoy both the privilege and responsibility of interpreting the values of research to their patients.

The patient is the direct beneficiary from all forms of continuing education. If regularly assigned office hours are reserved for scientific reading, it is reasonable to consider such time as a legitimate office expense and therefore considered when professional fees are determined. A professional man or woman never ceases to be a student. The ideal educational curriculum is designed to educate the student so he will continue to educate himself.

The Council extends its grateful acknowledgment for valuable assistance in the preparation of this review to Paul E. Boyle, Edgar D. Coolidge, Thomas B. Coolidge, M.D., Ph.D., and V. Brightman, Seymour J. Kreshover and Albert L. Russell, Lon W. Morrey, and Samuel Pruzansky.

This review edited and collated by J. Roy Blayney, vice-chairman, Council on Dental Research.

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ENDODONTICS IN 1957

Edgar D. Coolidge, D.D.S., M.S., Chicago

The pulps of many teeth are destroyed by trauma. Accidents occur and the pulps suffer injury from shock which, in due time, causes all vitality in the pulp tissue to be lost. This process of degeneration may require many weeks or months before total necrosis has developed. In some instances the process is so gradual that no pain is experienced by the patient.

BACTERIOLOGICAL RESEARCH

Macdonald, Hare and Wood of Toronto[1] reported on the occurrence of cultivable bacteria in the pulp contents of intact human teeth showing no vital response. In this study the contents of the pulp cavities of 46 intact, unfractured teeth in patients with ages ranging from three to 34 years and with a history of trauma were examined bacteriologically. Of these 46 teeth, 19 had roentgenographically normal periapical tissue and 27 showed evidence of periapical tissue involvement.

Professor emeritus, periodontia and endodontia, Loyola University School of Dentistry.

1. Macdonald, John B.; Hare, George C., and Wood, A. W. S. Bacteriologic status of the pulp chambers in intact teeth found to be nonvital following trauma. Oral Surg., Oral Med. & Oral Path. 10:318 March 1957.

Their findings revealed a growth of organisms in 38 instances. Twenty strains of aerobic streptococci and 15 strains of micrococci were isolated and identified. They also found 12 strains of anaerobic gram-positive cocci. There seemed to be no relation between the time lapse from the injury to the time of the bacteriologic test which ranged from 14 days to 20 years, whereas the eight pulp canals with negative cultures had an interval of one month to three years before this test was made.

They postulated that these organisms must have come from the gingival crevices via the lymphatics and blood stream. The authors quote Menkin who has shown that "blood-born bacteria may localize in areas of inflammation within 30 minutes after an injury." Positive cultures were obtained in 83 per cent of the teeth treated.

INTACT PULPLESS TEETH

A few decades ago the campaign against foci of infection became so intense that it was difficult to combat the wave of tooth extraction intended to eliminate possible sources of infection in diseased pulps and in periapical regions of teeth with root canals containing fillings of all kinds, good or bad. Bacteriological studies were instituted by those who could not believe that the use of forceps would be the answer to the problem of pulp-involved teeth. Through improved technics of treatment, together with culture-controlled methods, plus a wider field of remedies for sterilizing root canals, considerable progress has been made in endodontic practice.

The newer technics in microscopy and bacteriology reveal bacterial invasion of roentgenographically normal appearing periapical root areas of teeth with unexposed pulps. It presents a new and greater problem in diagnosis. A new challenge confronts the endodontist.

Brown and Rudolph[2] of the U. S. Naval Dental School present a report of their study of the bacterial flora found in unexposed pulp canals.

In this study, teeth having unexposed pulp canals, no deep carious lesions, no discernible gross anatomic defects, no large restorations, no extensive periodontal involvement, and no history of severe trauma, were used.

The cultures revealed a wide variety of organisms with a high incidence of streptococci, diphtheroids and micrococci. Microbial forms were found in 90 per cent of the specimens when examined by phase contrast and dark field microscopes. Direct stained smear technics were used and organisms were found in 71 per cent of the specimens. Some organisms were observed by the microscope that could not be cultivated. *Micrococcus pyogenes* var. *aureus* and *M. pyogenes* var. *albus* were rarely isolated and candida (monilia) and lactobacilli were never isolated from the cultures from these unexposed pulp canals. Fusobacteria were found in six specimens, but were not culturable in this study.

In all cultures 51.3 per cent were facultative anaerobes; 23.9 per cent anaerobes; 23.9 per cent aerobes and 0.8 per cent required 10 per cent carbon dioxide for growth.

This surprising observation seems to indicate the need for more exacting examination of all teeth so that degenerating and dead pulps may be recognized at an early stage. Suspicion cannot safely be limited to teeth ravaged by caries and containing large restorations or artificial crowns.

Hampp,[3] of the National Institute of Dental Research, made a detailed study of the occurrence, isolation, cultivation, and identification of the spirochetal organisms in material from 38 specimens obtained from the bacteriological investigations of Mazzarella, Hedman, and

2. Brown, Lee R., and Rudolph, Charles E., Jr. Isolation and identification of microorganisms from unexposed canals of pulp-involved teeth. Oral Surg., Oral Med. & Oral Path. 10:1094 Oct. 1957.

Brown[4] and later of those of Brown and Rudolph.[2]

Of 38 specimens obtained, eight gave negative cultures. Of these specimens, 21 had shown spirochetes by microscopic examination. By culture technic, only 14 cultures were positive for spirochetes from which ten strains of small type treponemas were isolated; two of them were gas producing. No *Borrelia vincentii* or *B. buccale* were found. One strain of *Spirillum sputigenum* was isolated in pure culture.

INOCULATION OF STREPTOCOCCI INTO ROOT CANALS

Reasoning from the frequency with which active rheumatic fever follows an infection with Group A hemolytic streptococci, Kennedy, Hamilton, and Syverton[5] introduced *Streptococcus pyogenes hemolyticus* Group A and C into root canals of 12 young *Macacus mulatta* monkeys' teeth. Histopathologic examination of the periapical regions of eight of the monkeys revealed little difference between the inoculated canals and the canals of the control animals from which the pulps had been removed but were not inoculated. Cultures from the root canals in five of the inoculated animals, even as late as nine weeks in one monkey, yielded viable streptococci. Cultures made from the root canals at autopsy yielded streptococci in five of the inoculated animals. Myocarditis was observed in 11 animals, but no cardiac changes typical of rheumatic disease were found. Blood cultures had been taken on the first, fourth and the seventh days and examined microscopically. Blood cultures in the second experiment had revealed a slight bacteremia in one animal that lasted 15 minutes.

ANTIBIOTIC INVESTIGATION

Ramnarine and Altinsel,[6] reported a comparative study on the effectiveness of various antibiotics in different concentrations against organisms present in dental infections. They used 141 teeth for the study that had been extracted because of deep caries. The teeth were immersed in antibiotic solutions for from two to five minutes, removed, split and cultures made of the carious material, shavings of surrounding dentin and portions of the pulp.

The teeth that had been immersed in oxytetracycline (Terramycin) in concentration of 250 mg. per milliliter yielded negative cultures in 92 per cent. The teeth immersed in penicillin sodium in concentration of 75,000 units per milliliter yielded 88 per cent of negative cultures. A combination of penicillin 250,000 units per milliliter with streptomycin 250 mg. per milliliter yielded 70.8 per cent of negative cultures. Those teeth immersed in 125 mg. of oxytetracycline yielded negative cultures in 65.5 per cent of tests.

Several other standard antibiotic solutions were tested in various concentrations resulting in a gradually lowering percentage yield of negative cultures. The microorganisms encountered were largely streptococci of the viridans and alpha hemolytic type, lactobacilli and staphylococci with a few diplococci, filamentous organisms and leptotrichia.

CULTURING TECHNIC

When antibiotic dressings have been sealed in a canal, it has been found that the residual antibacterial effect of the

3. Hampp, Edward G. Isolation and identification of spirochetes obtained from unexposed canals of pulp-involved teeth. Oral Surg., Oral Med. & Oral Path. 10:1100 Oct. 1957.

4. Mazzarella, M. A.; Hedman W. J., and Brown, L. R., Jr. Classification of microorganisms from pulp canals of nonvital teeth. Research Report, Project NM 009.015.10.01 U. S. Naval Dental School, Bethesda, Md., Aug. 1, 1955.

5. Kennedy, Donald R.; Hamilton, Tom R., and Syverton, Jerome T. Effects on monkeys of introduction of hemolytic streptococci into root canals. J. D. Res. 36:496 August 1957.

6. Ramnarine, Krishna C., and Altinsel, Hasip H. Antibiotics in operative procedures and endodontics: in vitro studies. J. D. Res. 35:914 Dec. 1956.

antibiotic often inhibits growth of the organisms in the culture tube unless all of the antibiotics used are neutralized. Penicillinase and cystiene have been found to inactivate penicillin and streptomycin, but no inactivator has been found for bacitracin.

Grossman, Parris and Cobe[7] endeavored to find a method that would remove all traces of bacitracin in a combination of antibiotics that might be carried from a root canal under treatment into the culture tube. They concluded from the experiments that it seemed reasonable to assume, after drying the canal three times with sterile absorbent points before taking the culture test, there would be very little chance of transferring any of the polyantibiotic paste on the fourth absorbent point to the culture media, thereby assuring the operator of an accurate culture test.

ENDODONTIC MEDICATION

An interesting series of tests were made by Dietz[8] to show the pharmacological effect and the bactericidal activity of a combination of medicaments that have been found to give excellent clinical results. The combination consists of: parachlorophenol, 25 Gm.; metacresylacetate, 25 Gm.; and camphor (USP), 50 Gm.

Five per cent rabbit blood agar plates were seeded in pairs with standard test microorganisms: *Streptococcus faecalis,* A.T.C.C. no. 10541, *Streptococcus faecalis,* A.T.C.C. strain "R" no. 8043, and *Micrococcus pyogenes* var. *aureus,* A.T.C.C. no. 6538. The two active drugs in the combination were proved bactericidal in the test, individually and when combined with camphor, by the zones of inhibition on the plates. When subcultures were made from the lytic zones in Trypticase soy broth, they yielded negative growth. The low surface tension of the metacresylacetate added to the penetrability of the combination and was supposed to produce a synergistic effect. The combination and each drug were tested separately intracutaneously by injecting 0.05 ml. into the forearm to observe the tissue reaction. The inflammation and scar formation was slight with metacresylacetate, moderate with the combination, and more active and longer lasting with the parachlorophenol alone. The combination was recommended as a "medicament unsurpassed" for the infected root canal or, because of its mildness, as a universal medication in all endodontic treatment.

PULP AMPUTATION

A study of pulpotomy was undertaken by James, Englander, and Massler[9] in an attempt to establish reproducible criteria for histological evaluation of pulpal response in human teeth to pulpotomy and to use these criteria to compare two groups of materials; namely, calcium compounds and antibiotics commonly used in covering the pulp stump.

The study, made among naval personnel ranging in age from 18 to 24, was based on 175 teeth with vital pulp exposures resulting from caries and with a history of pain. Thirty teeth were extracted without pulp amputation and were considered as unoperated controls. Ten teeth were operated on but were extracted immediately without further treatment and used as nonmedicated controls to show the immediate effects of the operation. The remaining 135 teeth were subjected to pulp amputation and covered with various dressings. One of four calcium compounds was used to

7. Grossman, Louis I.; Parris, Leonard, and Cobe, Herbert. Antibacterial effect of residual bacitracin during culturing from root canal. Oral Surg., Oral Med. & Oral Path. 10:426 April 1957.

8. Dietz, Victor H. XP-7: A universal endodontic medicament. Oral Surg., Oral Med. & Oral Path. 10:1317 Dec. 1957.

9. James, Verda Elizabeth; Englander, Harold R., and Massler, Maury. Histologic response of amputated pulps to calcium compounds and antibiotics. Oral Surg., Oral Med. & Oral Path. 10:975 Sept. 1957.

cover each of 76 pulp stumps, and one of four antibiotics was used to cover each of 49 pulp stumps. A combination of an antibiotic with one of the calcium compounds was used to cover ten pulp stumps. The interval of time between pulp amputation and the extraction of teeth from the medicated group ranged from four to 181 days.

The investigators chose as the basis of their research to observe the following changes within the pulp: (1) degree of inflammation; (2) bridging on the surface of the pulp stump; (3) the incidence of internal resorption; (4) internal hemorrhage; and (5) the type of a clinical clot (the clot formed after the surgical procedure).

They concluded that:

1. Pulp amputation did not contribute to or cause pulp necrosis.
2. Inflammatory response was greater under all antibiotics and less under all calcium combinations; lowest under calcium hydroxide and highest under penicillin.
3. Bridging occurred under all materials, but least under antibiotics.
4. Internal resorption occurred in 19 per cent of the teeth. The incidence was less severe as was the inflammation under the calcium compounds.
5. Of the antibiotics, the penicillin, bacitracin, streptomycin and caprylate sodium mixture showed the best evidence of bridging; penicillin showed the highest incidence of internal resorption.
6. When a combination of calcium compounds and antibiotics was used, the response resembled that from the antibiotics.
7. Internal hemorrhage and the clinical clot seemed to have no significant correlation to the other criteria.

PULP CAPPING

Jensen[10] experimented on the pulps of dogs' teeth in an effort to compare the reaction of exposed pulps to calcium hydroxide alone and when a composition of calcium hydroxide, zinc oxide, iodoform, phenol, and eugenol was used. A thin sterile paste made with the powder and distilled water was placed over the exposed pulps of 12 teeth in each of three dogs, and the cavities were sealed with oxyphosphate of zinc cement. The animals were sacrificed in four weeks, six weeks and eight weeks.

Histologic examination revealed no distinguishable difference in the rate of healing after four to eight weeks under either type of capping. There appeared to be no advantage or disadvantage in adding zinc oxide, iodoform, phenol and eugenol to calcium hydroxide as a capping agent for exposed, vital dental pulp tissue.

INSTRUMENT STERILIZATION

The complete sterilization of instruments is a very important and necessary duty in a dental practice. Careless or inadequate methods of sterilization may result in the inoculation of innocent patients with disease, causing great distress and pain.

A comprehensive study of the literature of the various methods of sterilization of instruments for dental and surgical practice was made by Maurice.[11]

The microorganisms considered were various bacteria, fungi, yeasts and molds, rickettsiae, protozoa, spore-bearing organisms and viruses. References to 55 articles on disinfection and sterilization are cited. Medical literature, in several instances, emphasizes the probability of inoculating patients with viral hepatitis through inadequately sterilized lancets and hypodermic needles.

Although there are some disadvantages in boiling such sharp edged instruments,

10. Jensen, James R. Histologic comparison of two pulp capping agents. J.A.D.A. 54:595 May 1957.

11. Maurice, Charles G. A critical survey of the methods of instrument disinfection and sterilization. J.A.D.A. 55:527 Oct. 1957.

it is shown clearly that moist heat by boiling instruments in water at 100° C. or oils at 185° C. for 15 minutes, or by autoclave at 121° to 123° C. for 20 minutes, is the most dependable. Most other methods are unreliable for destroying spores and the virus of viral hepatitis.

TISSUE REACTION TO AMALGAM

An investigation of tissue reaction to amalgams was reported by Eger and Fischer.[12] They implanted copper and silver amalgam in the mandibles of dogs which were sacrificed six to 11 months later.

They concluded that, in the absence of notable chronic inflammation in the regions where copper amalgam implants had been buried, and severe inflammation around the encapsulated regions where silver implants were, that copper amalgam used in root canal fillings was justifiable. However, clinical investigation of 692 teeth which had copper amalgam canal fillings revealed the most favorable results when no excess of amalgam remained after filling the canals and where apicoectomy followed root canal filling.

In the opinion of the writer, the use of gutta-percha tapered points with a cementing paste or chlora-percha solution will produce a more accurate filling of root canals and there is very little foreign body irritation to slight excesses of this filling material.

12. Eger, W., and Fischer, C. H. Animal experiments and clinical investigations on tissue reaction to amalgam. D. Abs. 2:174 March 1957.

PERIODONTAL DISEASE

S. J. Kreshover, D.D.S., M.D., Ph.D., and*
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An expanding interest in periodontal research, noted in earlier years, continued its upward trend in 1957. Although the rather considerable number of contributions to the literature covered such varied aspects as etiology, pathology and therapy, it was gratifying to note the increased attention that was given to epidemiologic studies.

It has been stated that an essential step in the achievement of more effective preventive and therapeutic procedures for periodontal disease is the development of valid indexes for determining prevalence and epidemiologic characteristics.[1] In a review of the epidemiology of periodontal disease, Belting[2] pointed out two areas of consistent agreement: early age of onset, that is, at about the time of puberty, and peak incidence in middle life. Further data on gross incidence, sex, racial, and urban-rural differences were contributed by Russell and his associates. In one study,[3] some 30,000 persons (whose ages ranged from 5 to over 80 years) residing in 14 different urban communities of six states were surveyed. All examinations were carried out under comparable conditions and the method of scoring first described by Russell in 1956[4] was used. Among the more significant observations

*Associate director, National Institute of Dental Research.

†Chief, epidemiology and biometry branch, National Institute of Dental Research.

1. Report of Evaluating Committee V: Prevention of periodontal disease. University of Michigan, 1951 Periodontal Workshop. J.A.D.A. 45:33 July 1952.

2. Belting, C. M. A review of the epidemiology of periodontal diseases. J. Periodont. 28:37 Jan. 1957.

3. Russell, A. L. Some epidemiological characteristics of periodontal disease in a series of urban populations. J. Periodont. 28:286 Oct. 1957.

4. Russell, A. L. A system of classification and scoring for prevalence surveys of periodontal disease. J. D. Res. 35:350 June 1956.

were (1) although prevalence and severity of periodontal disease increased with age, the onset of destructive lesions occurred very early in life, that is, the teen ages; and (2) whereas young girls were more severely affected than boys, the sex incidence was reversed after the age of 20 to 30 years.

Another study reported by Benjamin, Russell and Smiley[5] undertook to determine whether differences in prevalence or severity of periodontal disease could be related to residence in a rural rather than an urban community. They based their observations on over 3,000 individuals (whose ages ranged from 9 to 20 years) residing in 25 Indiana counties. They suggested that rural life, in itself, is not a factor conducive to periodontal disease, but rather that social or economic factors influence prevalence and severity. This was supported by further analyses of these and additional data.[6]

Parfitt,[7] in studying the factors which affect gingivitis, emphasized the necessity for assessing severity as well as occurrence. Consequently, in examining 255 boys and girls (with ages ranging from 2 to 17 years) living in an institution outside of London, a modification of the P.M.A. index was utilized which added an estimate of severity to the diagnosis of gingival disease. Among the more interesting observations reported were (1) a prevalence and severity of gingivitis that reached a peak for boys at 13 years and for girls at 11 years, and (2) a seasonal incidence of gingivitis which showed slightly lower values for August, September, October and November than for other months.

In the research area concerned with clarification of factors contributing to periodontal disease, several interesting contributions to the literature may be cited. Stahl, Miller and Goldsmith[8] further explained the role of protein in maintaining healthy tooth-supporting tissues, and demonstrated that young rats maintained on a protein-free diet developed degenerative periodontal changes which could be repaired readily by restoration of a normal diet. On the other hand, when protein deficient animals were subjected to the additional insult of local irritation induced by occlusal trauma, the periodontal tissues were not benefited by restoring an adequate level of protein to the diet.

Another study demonstrating the important relationship of certain dietary factors to periodontal disease was reported by Bavetta, Bernick and Ershoff.[9] Whereas the addition of tryptophan in 600 mg. per kilogram quantities was found to correct to a great extent the pathologic changes in the bones and dental structures of rats that had been on tryptophan-free rations, there was no correction of abnormalities when desiccated thyroid was used previously to induce a hyperthyroid state. It was further noted that the tryptophan requirement was significantly increased in animals receiving dietary thyroid. The characteristic periodontal and bone changes in deficient animals were alveolar osteoporosis and retardation of endochondral and periosteal bone formation.

Other hormonal influences on periodontal tissues have been described. Motivated by the predominant occurrence of periodontosis in women of reproductive age, and by the generalized osteoporosis sometimes exhibited by women after the menopause, Wiener, Karshan and Tenenbaum[10] sought to correlate

5. Benjamin, E. M.; Russell, A. L., and Smiley, R. D. Periodontal disease in rural children of 25 Indiana counties. J. Periodont. 28:294 Oct. 1957.

6. Russell, A. L. A social factor associated with the severity of periodontal disease. J. D. Res. 36:922 Dec. 1957.

7. Parfitt, G. J. A five year longitudinal study of the gingival condition of a group of children in England. J. Periodont. 28:26 Jan. 1957.

8. Stahl, S.; Miller, S., and Goldsmith, E. The effects of vertical occlusal trauma on the periodontium of protein deprived young adult rats. J. Periodont. 28:87 April 1957.

9. Bavetta, L. A.; Bernick, S., and Ershoff, B. The influence of dietary thyroid on the bones and periodontium of rats on total and partial tryptophan deficiencies. J. D. Res. 36:13 Feb. 1957.

ovarian function with the severity of periodontal disease. They based their data on interpretation of vaginal smears from 33 patients with diagnoses of periodontosis, and reported that women with presumably good ovarian cycles had fewer occurrences of severe disease (4 out of 19) than did women with so-called poor cycles (8 out of 14). Möhnicke and Ulrich,[11] in a study of 500 diabetic patients, reported a 21 per cent incidence of periodontal disease in the initial stages of diabetes. On the other hand, established diabetics with vascular systemic involvement as against those without such involvement showed respective incidences of 70 and 39 per cent.

A particularly interesting study was reported by Sallay[12] on the occurrence of periodontal disease in cyanotic patients who had either an acquired or congenital heart disease. Both groups, comprised of 155 and 33 subjects respectively, showed an incidence of gingival cyanosis and alveolar and gingival atrophy in about 75 per cent of the patients. An additional observation of apparent significance in the congenital cyanotic group was the uniformly high level of kallikrein in the saliva of individuals with periodontosis when compared with that of patients free of periodontal disease. Kallikrein is identified as a substance occurring in the salivary glands and pancreas, secreted into the oral cavity, blood and small intestine, excreted in the urine, and capable of exerting a vasodilator effect on the vascular system.

Questions related to the mechanism of periodontal tissue breakdown necessarily involve a primary consideration of collagen. Swanson,[13] in a study of saliva collected from 40 patients suffering from a variety of periodontal conditions, could detect no evidence of collagenase activity. He based his report on the failure to break down gelatin, Azocoll or unaltered rat tail collagen, and he suggested that either the enzyme was so minimal in his saliva specimens as to be undetectable, or was accumulated in recesses that protected it against ready contact with the saliva. Certainly, much remains to be learned on this subject.

Pathologic considerations of periodontal disease as related to morphologic study under the microscope led Stanley[14] to evaluate a step-serial sectioning technic. A comprehensive study was made of human autopsy material and it was found that, when about 33 sections were taken per millimeter of tissue, examination of every twentieth section was as useful as the study of either every section or every fifth section. With reference to local extension of inflammatory disease, Goldman[15] described the course of the infiltrate in marginal periodontitis as an apical progression into the alveolar processes and into the gingival tissue itself. From these observations on human material, he concluded that the changes which occur when the periodontium is subjected to marginal injury and to occlusal trauma are changes which are independent of each other.

Further studies by Waerhaug[16] during the past year were directed toward an evaluation of tissue response to acrylic root tips. In an experiment on four dogs and four monkeys, this investigator found that acrylic resin placed in an extraction socket was well tolerated by the surrounding soft tissues and, in fact, frequently showed appearances of typical "epithelial attachments." Such observations have

10. Wiener, R.; Karshan, M., and Tenenbaum, B. Ovarian function in periodontosis. J. D. Res. 35:875 Dec. 1956.

11. Möhnicke, G., and Ulrich, K. H. Erkrankungen der Zähne und ihres Halteapparates bei Diabetikern. Klin. Wschr. 34:432, April 1956.

12. Sallay, C. Periodontal findings in cyanotic individuals. J. D. Res. 35:840 Dec. 1956.

13. Swanson, A. Is collagenase found in saliva from periodontal diseased mouths? J. D. Res. 36:717 Oct. 1957.

14. Stanley, H. R. The value of step-serial sectioning in the morphologic study of human periodontal disease. J. Periodont. 28:248 July 1957.

15. Goldman, H. M. Extension of exudate into supporting structures of teeth in marginal periodontitis. J. Periodont. 28:175 July 1957.

16. Waerhaug, J. Tissue reaction around acrylic root tips. J. D. Res. 36:27 Feb. 1957.

led Waerhaug to conclude that no basic difference seems to exist between the pocket around an acrylic root tip and the pocket around a natural tooth. Furthermore, a membrane similar to the "primary cuticle" was observed on the surface of the epithelial cuff around the acrylic roots.

Linghorne,[17] continuing his interesting experiments on reattachment and regeneration of supporting structures of the teeth of dogs, described a method by which regeneration occurs in epithelized pockets. Significantly, this reattachment was produced by a deposition of new cementum on the experimentally denuded root surface.

The effectiveness of toothbrushing in gingival treatment was evaluated in two studies during the past year. In the first, Stanmeyer[18] attempted to correlate the toothbrushing frequency of 3,068 persons (the information was obtained by questionnaire) with the gingival health, using the P.M.A. index as a standard of measurement. The results of this survey indicated to the investigator that gingival massage, in the form of toothbrushing, was beneficial, and that there was a significant decrease in gingival inflammation. Unfortunately, this report seemingly neglects a consideration of the possible benefits that might have been related entirely, or even in part, to the hygienic effects of toothbrushing rather than massage alone. A later study by Massler, Rosenberg, Carter and Schour[19] on 154 young adult men who were instructed to brush their teeth twice a day reported improvement in only 9.7 per cent after 15 weeks; in 17.5 per cent there was improved cleanliness of the enamel and gingivae. Based on these observations, it was concluded that the permissive program of toothbrushing was not effective.

Since calculus is a prime local irritating factor in periodontal disease, considerable attention must be directed toward a better understanding of its mechanism of formation. S. Wah Leung[20] described a new method for its "artificial" *in vitro* production in which teeth were alternately immersed in saliva and then exposed to air. He concluded that the material deposited was similar to *in vivo* calculus. In another study of calculus formed *in vivo,* Mandel, Levy and Wasserman[21] speculated that there may be a common basic mechanism of calcification, that is, the carbohydrate-protein complexes present in the matrixes of calcifying tissues being the common denominator.

In regard to other causes of irritation, Zander[22] reported that silicate cement and amalgam restorations, when extended beneath the gingival crest in dogs, induced severe inflammatory responses similar to that seen around calculus. Interestingly enough, such tissue reaction occurred regardless of whether the restorations were polished or simply smoothed. A similar study by Waerhaug and Zander,[23] in which self-curing acrylic restorations were used, showed that there was a chronic inflammatory reaction in the adjacent gingival cuff, crevice formation between the resin and the tooth cavity which was filled with plaque and necrotic material or epithelium, and plaquelike material between the restoration and the pocket epithelium.

A condition resembling periodontitis was produced in dogs by Collings[24] who

17. Linghorne, W. J. Studies in the reattachment and regeneration of the supporting structures of the teeth. IV. Regeneration in epithelized pockets following the organization of a blood clot. J. D. Res. 36:4 Feb. 1957.

18. Stanmeyer, W. R. A measure of tissue response to frequency of toothbrushing. J. Periodont. 28:17 Jan. 1957.

19. Massler, M., and others. Gingivitis in young adult males: lack of effectiveness of a permissive program of toothbrushing. J. Periodont. 28:111 April 1957.

20. Wah Leung, S. A new method for the in vitro production of artificial calculus. J. Periodont. 28:217 July 1957.

21. Mandel, I.; Levy, B., and Wasserman, B. Histochemistry of calculus formation. J. Periodont. 28:132 April 1957.

22. Zander, H. Effect of silicate cement and amalgam on the gingiva. J.A.D.A. 55:11 July 1957.

23. Waerhaug, J., and Zander, H. Reaction of gingival tissues to self-curing acrylic restorations. J.A.D.A. 54:760 June 1957.

24. Collings, C. K. Experimental production of periodontitis in dogs. J. Periodont. 28:7 Jan. 1957.

removed 2 to 3 mm. of bone from the alveolar crest with bone burs and chisels. An acute gingivitis developed at the outset; after about a year the process had advanced to a point where bone loss was extreme and teeth were mobile.

Although monkeys and dogs are perhaps the most commonly used and most valuable animals for periodontal research, the rodent family continues to contribute to the store of knowledge. Inasmuch as the ferret has been thought to have the same morphologic type of periodontal tissue as man,[25] Staple[26] undertook to determine whether its gingiva is the same from the standpoint of histochemical reactions. He studied ferrets with all stages of transition, from clinically normal to chronically inflamed marginal gingivae, and observed that the distribution of alkaline phosphatase activity in the gingiva of the ferret differed strikingly from that in man. On this basis it was concluded that any previous statements about the similarity of the pathogenesis of gingival disease in ferrets and man must be subject to reservation.

Several interesting reports on the subject of diagnosis and treatment appeared during the past year. Berghagen and Hjelmstrom[27] described a new method for following the development of marginal periodontal disease by measuring the bone changes in relation to the apex of a tooth. By utilizing two reference points that appear on all roentgenograms of a series, periodic measurements can be made which presumably are comparable.

In a study of healing after surgical detachment of periodontal tissues, Morris[28] reported that although no repair took place against dentin of nonvital teeth, there was healing against both untouched and curetted cementum. Another study by Tenenbaum, Nahoun, Karshan, Wiener and Beube[29] sought to evaluate the results of several different types of treatment of periodontosis. These included local therapy with and without vitamin-calcium-phosphorus administration, vitamin-mineral treatment alone, hormone (methylandrostenediol) administration, and splinting. The observations made in this study indicated that stabilization of the teeth by splinting provided the most favorable conditions for the healing of alveolar bone.

In a rather provocative paper, Bibby[30] discussed the possibility of vaccine therapy in periodontal disease and suggested its re-evaluation in light of newer advances in microbiology.

25. King, J. D. Experimental investigations of parodontal disease. I. The significance of the blood supply in gingival health and disease of the ferret. Brit. D. J. 77:213 Oct. 20, 1944.

26. Staple, P. H. Alkaline phosphatase activity in gingiva of the ferret. Brit. D. J. 102:305 April 16, 1957.

27. Berghagen, N., and Hjelmstrom, P. Radiographic measurements of bone changes in the alveolar limbus in a case of marginal periodontal disease. Acta Odont. Scandinav. 14:221 Nov. 1956.

28. Morris, M. L. Healing of human periodontal tissues following surgical detachment from non-vital teeth. J. Periodont. 28:222 July 1957.

29. Tenenbaum, B., and others. Results of several types of treatment of periodontosis. J.A.D.A. 55:651 Nov. 1957.

30. Bibby, B. G. A consideration of vaccine therapy in periodontal disease. J. Periodont. 28:300 Oct. 1957.

ENAMEL CARIES—1957

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An attempt is made here to cover important work of 1957 bearing on the mechanism of enamel caries. Limitations of length, deadline, and access to all pertinent Russian literature make the coverage incomplete.

GENERAL MECHANISM

The duplication *in vitro* of early smooth surface clinical caries[1] reproduces the very characteristic series of microscopic zones described by Nishimura.[2] The duplication is produced by exposing pieces of enamel to sterile solutions containing only hydrogen, calcium and phosphate ions and the duplication is exact in detail only when the solutions have one of a very limited number of concentration patterns. An ion pattern which affects enamel to produce exactly the changes seen in early clinical white spot enamel caries will be referred to as a "leaching ionic pattern." In the mouth, the change from the normal ionic pattern at the surface of the enamel to a leaching ionic pattern is largely a matter of the pH changes first measured over carious areas by Stephan, but it has not been shown that alterations in calcium and phosphate concentrations do not play a role in the clinical production of the leaching ionic pattern.

Gustafson[3] has published a description of the early carious lesion which, in our opinion, substantiates Nishimura. He adds valuable data on the hardness of the enamel in the various zones. We regret his revision of Nishimura's nomenclature of the zones and hope that Nishimura's zonation will remain the standard, although not perfect, for reasons of priority and convenience. Darling[4] has duplicated many of the features of early enamel caries *in vitro* including many of those seen in polarized light. His work on the nature of the birefringence and his quotation of a generous admission of error by Keil are noteworthy. The duplication of certain changes in birefringence was also reported by Hals and co-workers.[5]

As long as the early carious lesion lacked a systematic, accurate description, it was impossible to duplicate the lesion in a convincing way. The substantial agreement on the chief features of a very characteristic and unique pathology and the duplication of this pathology under exactly definable chemical conditions have in our opinion placed the general nature of the mechanism of caries on a very firm experimental foundation.

CHEMICAL AND PHYSICAL ASPECTS

That the leaching process of early enamel caries involves the removal of an inorganic moiety richer in carbonate from one less rich has been suggested by Gore and Hardwick. Direct analytical evidence to

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1. Coolidge, T. B.; Besic, F. C., and Jacobs, M. H. Microscopic comparison of clinically and artificially produced changes in enamel. Oral Surg., Oral Med. & Oral Path. 8:1204 Nov. 1955.

2. Nishimura, T. Histological investigations on the beginning of dental caries, especially caries of the enamel. (In German) Schweiz. Mschr. Zahnh. 36:491, 1926.

3. Gustafson, G. Histopathology of caries of human dental enamel with special reference to the division of the carious lesion into zones. Acta Odont. Scandinav. 15:13 March 1957.

4. Darling, A. I. Studies of the early lesion of enamel caries with transmitted light, polarized light and radiography. Brit. D. J. 101:289 Nov. 6; 239 Nov. 20, 1956.

5. Hals, E.; Morch, T., and Sand, H. F. Effect of lactate buffers on dental enamel in vitro as observed in polarizing microscope. Acta Odont. Scandinav. 13:85 Aug. 1955.

this effect is given for both clinical and artificial caries by Coolidge and Jacobs.[6] An interesting Russian paper[7] gives values for the calcium content of "chalky" enamel and for that of the enamel of carious and pre-carious teeth.

The space left in the interstices of the less soluble component by the leaching out of the more soluble one, varies in the different zones, which thus differ in the extent to which the fluid present may be displaced by other fluids. The total birefringence of the enamel (which gives rise to the striking features of caries in the polarizing microscope) is the sum of two kinds of birefringence: (1) form birefringence, which depends on the shape, size and orientation of the space referred to earlier, and on the refractive index of the fluid in this space; (2) intrinsic birefringence, which, both in normal and carious enamel, depends on the birefringence and orientation of submicroscopic crystals. A careful study of this orientation is reported by Lyon and Darling.[8] An interesting description of the zonation as observed with soft roentgen rays is that of Guzman, Brudevold and Mermagen.[9]

Dagaeva[10] has shown that the uptake of administered isotopic calcium by the enamel is predominantly through the saliva and that the amount taken up from the pulp is very small. The relatively low uptake of phosphorus and strontium by the enamel as compared with the uptake by cement and dentin is shown by Borovskii.[11] The data of Lisenko[12] appear to show that in the apparently sound enamel of teeth affected with caries, there is a greater uptake of labeled phosphate and a lower content of total phosphate than in normal teeth. More experimental details might be helpful. The high uptake of phosphorus by "chalky" carious enamel is probably to be explained by its permeability. Isotope experiments have been reported by Sognnaes.[13] The essential question in regard to the bearing of the isotope experiments on caries of the enamel is a quantitative one: To what extent do ions from other parts of the tooth oppose the local leaching ionic pattern?

HISTOLOGICAL ASPECTS

In caries of the enamel, the difference in permeability of the carious zones may give rise to ambiguity when histochemical stains are used because it may be uncertain whether an increase in depth of stain is due to an increase in the concentration of the substance for which the stain is specific or to an increase in penetration by the dye.

The intense staining of the edge of a "white spot" lesion with ninhydrin is interpreted by the authors of an interesting Russian paper[14] as evidence of proteolysis. If this interpretation is correct, it will be interesting to learn whether such proteolysis accelerates the penetration of the enamel by the carious lesion. This paper contains the only evidence known to us for proteolysis within the early lesion of enamel caries. A paper by M. H. Jacobs, Coolidge and Besic[15] comparing the histo-

6. Coolidge, T. B., and Jacobs, M. H. Enamel carbonate in caries. J. D. Res. 36:765 Oct. 1957.

7. Nikolaeva, N. V. Calcium content of the enamel of healthy teeth and of teeth in the early stages of caries. (In Russian) Stomat., Moscow No. 2:10, 1957.

8. Lyon, D. G., and Darling, A. I. Orientation of the crystallites in human dental enamel. Brit. D. J. 102:483 June 18, 1957.

9. Guzman, C.; Brudevold, F., and Mermagen, H. Soft roentgen-ray study of early carious lesions. J.A.D.A. 55:509 Oct. 1957.

10. Dagaeva, L. N. Significance of saliva in the mineral metabolism of enamel. (In Russian) Stomat., Moscow No. 5:17, 1955.

11. Borovskii, E. V. Phosphorus and calcium metabolism in hard tooth tissues in experimental vitamin B, deficiency in the dog. (In Russian) Stomat., Moscow No. 6:16, 1955.

12. Lisenko, N. V. Phosphorus metabolism in tooth tissues in caries by the isotope method. (In Russian) Stomat., Moscow No. 2:3, 1956.

13. Sognnaes, R. F. Relative significance of cellular and chemical remodeling of bones and teeth as revealed by radioactive isotopes. Oral Surg., Oral Med. & Oral Path. 10:167 Feb. 1957.

14. Sharpenak, A. E.; Nikolaeva, N. V., and Magid, E. A. Chemical composition of the enamel in the region of the white carious spot from histochemical observations. (In Russian) Stomat., Moscow No. 2:8, 1957.

15. Jacobs, M. H.; Coolidge, T. B., and Besic, F. J. In press. Brit. D. J.

logical and histochemical properties of clinical and *in vitro* enamel caries is in press. Unpublished work from our laboratory indicates that the zonation observed in white spot smooth surface caries is also observed on occlusal surface caries and that the brown pigmentation of some lesions penetrates the zones to a varying extent.

BACTERIOLOGICAL ASPECTS

Bacteria are required for the development of caries in man and animals. That they do this by bringing about the shift in the normal concentration of calcium, phosphate and hydrogen ions to a leaching ionic pattern appears to be established beyond doubt. Qualitative studies of plaque, whether caries active or inactive, show that the following organisms are generally present: streptococci, neisseria, lactobacilli, diphtheroids and yeasts. Lactobacilli are more frequently isolated from caries active than inactive plaques; however, quantitative bacteriological studies of the plaque material remain few.

The relative numbers of the bacterial types in saliva and salivary sediment correspond roughly to their relative numbers in plaque material. Thus the estimation of lactobacilli and acidogenic species in saliva gives an indication of existing caries activity, although in experimental animals the relationship is not found so consistently.[16,17] However, it seems dangerous to us to apply to the processes involved in the carious lesion data obtained from experiments using concentrations of organisms, more comparable with the concentrations in saliva than with the concentrations in plaque.[18-20] Experiments providing, *in vivo*, a controlled environment which reproduces conditions in the plaque[21] reveal much more relevant information.

The zoogleal nature of the dental plaque makes accurate counting of organisms difficult unless the plaque is first disintegrated. The paper by Green, Dodd and Inverso[22] describes the use of ultrasonic vibration for this purpose, but unfortunately does not give figures for absolute viable counts on plaque. Earlier workers,[23,24] using mechanical means of disintegration, have produced figures of the order of 10^8 bacterial cells per milligram wet weight of plaque material for total count, and of 10^5-10^7 bacterial cells per milligram for viable acidogenic species. Of the latter, by far the great majority are streptococci (predominantly alpha-hemolytic); neisseria total about one tenth, and lactobacilli from one ten thousandth to one thousandth of the numbers of streptococci present. Other groups are present in negligible numbers.

Quantitative studies of plaque material as to numbers of organisms present and their ability to produce acid[24] thus

16. Shiota, T. Effect of fluoride, iodoacetic acid, penicillin, sodium lauroyl sarcosinate and dehydroacetic acid on certain oral bacteria of white rats fed a smooth surface caries diet: preliminary report. J.A.D.A. 55:205 Aug. 1957.

17. Rogosa, M., and others. Relation of streptococci, lactobacilli, and the general oral and fecal flora to the progression of dental caries in the hamster. J. D. Res. 36:595 Oct. 1957.

18. Shklair, I. L.; Hoerman, K. C., and Englander, H. R. Inhibitory effect of sodium N-lauroyl sarcosinate on oral lactobacilli when grown on various media. J. D. Res. 36:129 Feb. 1957.

19. Neuwirth, I., and Baerger, P. J. Production of acids from glucose by oral microorganisms: acids of the Krebs cycle. J. D. Res. 36:769 Oct. 1957.

20. Shaw, J. H., and Sweeney, E. A. Comparative studies on the influence of antibiotic substances in dental caries in the white rat and the cotton rat. J. D. Res. 36:349 June 1957.

21. Zwemer, J. D. Lactic acid formation by lactobacilli exposed to fluoridized enamel. J. D. Res. 36:182 April 1957.

22. Green, G. E.; Dodd, M. C., and Inverso, H. S. Comparative microflora of developing dental plaques in caries-immune and susceptible individuals. J. D. Res. 36:331 June 1957.

23. Howitt, B. F., and Fleming, W. D. Quantitative examination of the mouth flora under different dietary conditions. J. D. Res. 10:33 Feb. 1930.

24. Stralfors, A. Investigation into the bacterial chemistry of dental plaques. Odont. Tskr. 58:155, 1950.

25. Orland, F. J., and others. Experimental caries in germfree rats inoculated with enterococci. J.A.D.A. 50:259 March 1955.

26. Pigman, W., and others. Action of individual bacterial strains on human teeth under in vitro conditions. J. D. Res. 36:314 April 1957.

27. Parfitt, G. J. Speed of development of the carious cavity. Brit. D. J. 100:204 April 17, 1956.

28. Barr, J. H.; Diodati, R. R., and Stephens, R. G. Incidence of caries at different locations on the teeth. J. D. Res. 36:536 Aug. 1957.

29. Ludwig, T. G., and Bibby, B. G. Acid production from different carbohydrate foods in plaque and saliva. J. D. Res. 36:56 Feb. 1957.

seem to show that the organisms responsible for the carious destruction of enamel in man are a relatively small group within the family *Lactobacteriaceae,* and that the most active organism is the alpha-hemolytic streptococcus, with some contribution from the relatively fewer lactobacilli.

Carious lesions have been produced by pure cultures of various other organisms in animals and *in vitro*.[25,26]

CLINICAL ASPECTS

Interesting reports have been published on the rate of progression of the carious lesion,[27] on the incidence of caries on various teeth,[28] on the effect of carbohydrates on caries,[29] and on salivary citrate and caries.[30]

MISCELLANEOUS ASPECTS

The mineralization of teeth;[31,32] the role of dietary carbohydrate in the development of caries resistance;[33,34] the positive relation of salivary protease in rats[35] and the absence of relation of certain salivary constituents to caries in man;[36] a method of autoradiography of teeth,[37,38] the chemical,[39] and histological[40] behavior of brown pigmentation have been described, and also the production of artificial caries in sugar solutions.[41]

30. Zipkin, I., and others. The relation of salivary citrate to dental caries experience in children 12 to 14 years old. J. D. Res. 36:823 Dec. 1957.

31. Belanger, L. F. Mineralization of rat enamel in the light of Ca-45 autoradiography and microincineration. J. D. Res. 36:595 Aug. 1957.

32. Engfeldt, Bengt, and Hammarlund-Essler, Erna. Studies on mineralized dental tissues. X. A microradiographic, autoradiographic and histochemical investigation on dental hard tissues in dogs with experimentally produced vitamin D deficiency. Acta Odont. Scandinav. 14:293 Jan. 1957.

33. Buxbaum, J. D., and others. Effect of diet on the deposition of glycoprotein in the teeth and its relationship to dental caries in the Syrian hamster. J. D. Res. 36:173 April 1957.

34. Steinman, R. R., and Haley, M. I. Early administration of various carbohydrates and subsequent dental caries in the rat. J. D. Res. 36:532 Aug. 1957.

35. Willett, N. P., and others. Comparison of salivary protease activity in the Hunt-Hoppert caries-resistant and caries-susceptible rats. J. D. Res. 36:223 April 1957.

36. Zipkin, I.; Bullock, F. A., and Mantel, N. Relation of salivary sodium, potassium, solids and ash concentration to dental caries experience in children, 5 to 6 and 12 to 14 years of age. J. D. Res. 36:525 Aug. 1957.

37. Boyd, J. D. Dental autoradiography. I. Choice of radioisotope. J. D. Res. 36:274 April 1957.

38. Boyd, J. D.; Sims, R. W., and Osgood, D. R. Dental autoradiography. II. Effect of printing technics on interpretation. J. D. Res. 36:281 April 1957.

39. Dreizen, S., and others. Experimental observations on melanoidin formation in human carious teeth. J. D. Res. 36:233 April 1957.

40. Bhussry, B. R., and Bibby, B. G. Surface changes in enamel. J. D. Res. 36:409 June 1957.

41. Muracciole, J. C., and Domínguez, A. The production of experimental caries by solutions containing refined carbohydrates. Rev. A. Odont. Argentina 45:281 Aug. 1957.

CONGENITAL MALFORMATIONS

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There are many reasons for the upsurge of interest in congenital malformations; first, because the general problem of causality of congenital malformations in man has become a matter of concern not only to the scientific community but to all who share in responsibility for the conduct of human affairs. This widespread interest stems from the debate on the genetic effects of man-made radiation. In 1957, this concern was displayed in newspapers and lay magazines as well as in scientific journals.

There are other reasons, less dramatic but more tangible, that account for the attention given to human malformations. According to a review by Warkany,[1] the profile of pediatric practice is changing. With the continued reduction in peri-

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1. Warkany, J. Congenital malformations and pediatrics. Pediatrics 19, Part 2:725 April 1957.

natal mortality, more attention is focused on every baby death.

Congenital malformations now account for about 14 per cent of all infant deaths in the United States. In New Zealand, where infant death rates are lower than in the United States, congenital malformations at the present time contribute 20 per cent to the general infant mortality.

The incidence and importance of congenital malformations cannot be established by mortality statistics alone. Many congenital malformations are undetected until later in life when they are unmasked by illness or the development of functional deficits. For example, congenital palatal insufficiency is rarely suspected until the child begins to speak with excessive hypernasality or else the anomaly is unmasked by adenoidectomy.[2] The nature of other congenital malformations is such that the child survives only to require continued hospitalization or confinement within the home. In others, successful habilitation as self-sustaining individuals is achieved only as a result of elaborate medical and dental care and special education.

For dental science, congenital malformations of the head offer a challenge and an opportunity.[3] The challenge is in the treatment of such patients and the opportunity is in research. These "experiments of nature" on fellow creatures, if properly considered, will yield new and useful knowledge far beyond the patients and the anomalies studied.

CASE REPORTS

As in every other year, the world literature contained numerous case reports of human teratomas. In the main, these were of no special interest for dental science except for reports of cranial defects[4] and intraoral[5,6] and nasal[7,8] dermoid cysts.

Pleydell[9] reported on an epidemiological study in Northamptonshire of four types of malformations of unknown etiology—mongolism, congenital malformations of the heart, cleft lip and cleft palate, and major malformations of the central nervous system. On the basis of the variable incidence reported from year to year in the same locale, the author suggested the operation of some inconstant environmental factor such as infection.

CONFERENCE ON TERATOLOGY

The outstanding publication of the year in the field of teratology was the special supplement to the April 1957 issue of *Pediatrics* which was devoted to the proceedings of a conference on congenital malformation held in Cincinnati, Ohio, in January 1956.

At this conference, Patten[10] reviewed developmental mechanisms involved in teratogenesis as a basis for a discussion on possible etiologic factors. He pointed out that the concept of "developmental arrest," although adequate in explaining cleft lip and cleft palate, failed to account for many other defects. Five other mechanisms leading to developmental aberrations were described and the conclusion drawn that it was futile to try to

2. Lis, E. F. The child with cleft lip and cleft palate. In Management of the handicapped child. Michal-Smith, H., editor. New York, Grune & Stratton, 1957.

3. Pruzansky, S. Foundations of the cleft palate center and training program at the University of Illinois. Angle Orthodont. 27:69 April 1957.

4. Kappers, J. A. Developmental disturbance of the brain induced by German measles in an embryo of the 7th week. Acta Anat. 31:1, 1957.

5. Koterla, B. Przypadek torbieli skorzastej jamy ustnej. (Intra-oral dermoid cyst.) Polski Tygod. Lek 12:522 Nov. 1957.

6. Alessi, R. Su un caso di cisti dermoide gigante del pavimento della bocca; studio anatomy-topografico della regione sublinguale, anatomo, patologico e clinico. (Case of giant dermoid cyst of the floor of the mouth; anatomico-typographic study of the sublingual region, pathologic anatomy and clinical aspects.) Minerva Chir. Tor. 12:308 Nov. 1957.

7. Verschuyl, E.; Greep, J. M., and Verschuyl, M. A. Aangeboren dermoidkysten van de neus. (Congenital dermoid cysts of the nose.) Ned. Tschr. Geneesk. 101:1116 Nov. 1957.

8. Ferratti, C. E. Quistes dermoides nasales. (Nasal dermoid cysts.) Bol. Soc. cir. Uruguay 26:271 Nov. 1957.

9. Pleydell, M. J. Mongolism and other congenital abnormalities: an epidemiological study in Northamptonshire. Lancet 272:1314 June 1957.

10. Patten, M. Varying developmental mechanisms in teratology. Pediatrics 19, Part 2:734 April 1957.

find an all-encompassing cause of congenital defects. Patten suggested that deficiency factors might account for the "developmental arrest" type, whereas regulatory factors and disturbances in timing can account for the other categories.

EXPERIMENTAL TERATOGENESIS

The artificial production of abnormalities, identical with those arising as the result of gene action, is not only interesting by virtue of the end result but becomes a useful tool in revealing the mechanisms underlying normal and abnormal processes of development. Present trends in experimental mammalian teratology reveal an expansion of interest from the morphologic study of abnormal embryos[11] and offspring[12] for abnormalities of physiology[13,14] and biochemistry.[15,16] Immunologic phenomena[17] and infectious agents[18] are also being considered.

Different teratogenic agents have produced artificial counterparts to almost all genetically caused abnormalities. However, Gluecksohn-Waelsch[17] warned that the resemblance of effects produced by different agents, genetic or environmental, does not necessarily imply actual resemblance of causal mechanisms but rather indicates a resemblance in the function of the reacting system. Thus, the similarity of cortisone-induced and genetically caused cleft palate does not mean that the genetically abnormal individual suffers from an excess of cortisone. Instead, it indicates that the material forming the palate is, at a particular stage, susceptible to cortisone as well as to an unknown factor acting on a genetic basis.

The question of specificity in experimental teratology was reviewed by Wilson.[19] Time-specific effects were demonstrated best when minimal effective dosages of various teratogenic agents were used. Agent-specificity was more difficult to establish from available experiments because of variability in dosages employed, species studied, age at which the offsprings were examined, and the influence of special interest on the part of the investigator.

Nelson[20] summarized the information derived from the production of congenital anomalies in mammals by maternal dietary deficiencies. The similarity of anomalies resulting from dietary and other teratogenic procedures was striking. Acute dietary deficiencies brought on by the use of antimetabolites indicated that the effect usually was limited to the critical period of differentiation and organogenesis, as it is in irradiation. Studies on the inter-relations of nutritional and genetic factors were urged as a means of determining individual susceptibility to teratogenic conditions.

Walker and Fraser[21] reported on the embryology of cortisone-induced cleft palate in two strains of mice. They determined that cortisone treatment caused cleft palate by interfering with the de-

11. Mohammed, C. I. Growth pattern of the rat maxilla from 16 days insemination age to 30 days after birth. Am. J. Anat. 100:115 Jan. 1957.

12. Julian, L. M., and others. Premature closure of the spheno-occipital synchondrosis in the horned Hereford dwarf of the "short-headed" variety. Am. J. Anat. 100:269 March 1957.

13. Woollam, D. H., and Millen, J. W. Effect of cortisone on the incidence of cleft palate induced by experimental hypervitaminosis A. Brit. Med. J. 5038:197 July 27, 1957.

14. Ingalls, T. H., and Curley, F. J. The relation of hydrocortisone injections to cleft palate in mice. N. England J. M. 256:1035 May 30, 1957.

15. Nelson, M. M., and others. Teratogenic effects of pantothenic acid deficiency in the rat. J. Nutrition 62:395 July 1957.

16. Monie, I. W.; Nelson, M. M., and Evans, H. M. Abnormalities of the urinary system of rat embryos resulting from transitory deficiency of pteroylglutamic acid during gestation. Anat. Rec. 127:711 April 1957.

17. Gluecksohn-Waelsch, S. Trends in mammalian teratology. Pediatrics 19, Part 2:777 April 1957.

18. Gabka, J. Tierexperimentelle Untersuchungen zur Erzeugung von Phanokopien durch toxoplasmen infektion. (Experimental research on induction of phenocopy through toxoplasmosis infection.) Zschr. menschl. Vererb. 34:38 Nov. 1957.

19. Wilson, J. G. Is there specificity of action in experimental teratogenesis? Pediatrics 19, Part 2:755 April 1957.

20. Nelson, M. M. Production of congenital anomalies in mammals by maternal dietary deficiencies. Pediatrics 19, Part 2:764 April 1957.

21. Walker, B. E., and Fraser, F. C. The embryology of cortisone-induced cleft palate. J. Embryol. Exp. Morph. 5:201 June 1957.

velopment of the condition within the palatine shelves that forces them to change their alignment from the vertical to the horizontal plane. The difference between the two strains in their susceptibility to the teratogenic action of cortisone was due in part to the earlier closing of the palate and lesser inhibition of shelf movement observed in the less susceptible strain of mice.

The results of 50 transabdominal amniocenteses in normal human beings during the last two trimesters of pregnancy were reported without evidence of maternal or fetal trauma.[22] The contrast to the high incidence of congenital malformations produced by amniotomy in mice was related to the stage of pregnancy in which amniocentesis was performed and the ratio of fetal volume to amniotic fluid in various species.

GENETIC HAZARDS OF RADIATION

The genetic effects of radiation on man continued to provoke profound concern among scientists. Crow,[23] in theorizing on the mutagenic effects of roentgen rays, gave some crude estimates of the genetic effect to be expected from 10 r of radiation (the amount recommended as the maximum average gonad dose for the population). Dobzhansky[24] wrote, "as far as genetic effects are concerned, the only safe dose of high-energy radiation is no radiation." This view was shared by other geneticists.[25, 26]

A recent statement by the United Nations Scientific Committee on the Effects of Atomic Radiation about the responsibilities of the medical profession in the use of roentgen rays and other ionizing radiation was a step in the direction of controlling irradiation of human beings.[27] An editorial statement[28] in THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION gave reassuring information regarding the minimal gonadal exposure during conventional dental roentgenographic examination.

GENETIC FACTORS

The interaction of genetic and environmental factors has been demonstrated on drosophila by Goldschmidt and Piternick,[29] and on several strains of mice by Kalter,[30] and Fraser and his associates.[31]

Recently, geneticists have become interested in American triracial isolates.[32] Because of several centuries of in-marriage, many genetically recessive traits have become manifest and many genetically dominant traits have become concentrated in a few families. An exceptionally high incidence of dentinogenesis imperfecta and other hereditary conditions has been reported in these groups.[33] Witkop's[34] survey of hereditary defects of enamel and dentin in the general population of children allows for interesting comparison with the triracial isolates.

Neel[35] suggested several useful lines of attack on the genetic aspects of human teratology. Included were the methods of comparative teratology to determine if

22. Parrish, H. M.; Lock, F. R., and Rountree, M. E. Lack of congenital malformations in normal human pregnancies after transabdominal amniocentesis. Science 126:27 July 12, 1957.

23. Crow, James F. Possible consequences of an increased mutation rate. Eugenics Quarterly 4:67 June 1957.

24. Dobzhansky, T. Genetic loads in natural populations. Science 126:191 Aug. 2, 1957.

25. Glass, B. The genetic hazards of nuclear radiations. Science 126:241 Aug. 9, 1957.

26. Japanese geneticists on radiation. Science 126:28 July 12, 1957.

27. U. N. and medical irradiation. Science 125:592 March 29, 1957.

28. Gonadal radiation incidental to dental roentgenology appears to be relatively insignificant. J.A.D.A. 55:722 Nov. 1957.

29. Goldschmidt, R. B., and Piternick, L. K. The genetic background of chemically induced phenocopies in drosophila. J. Exp. Zool. 135:127 June 1957.

30. Kalter, H. Factors influencing the frequency of cortisone-induced cleft palate in mice. J. Exp. Zool. 134:449 April 1957.

31. Fraser, F. C.; Walker, B. E., and Trasler, D. G. Experimental production of congenital cleft palate: genetic and environmental factors. Pediatrics 19, Part 2:782 April 1957.

32. Beale, Calvin L. American tri-racial isolates: their status and pertinence to genetic research. Eugenics Quarterly 4:187 Dec. 1957.

33. Witkop, C. J. A study of tri-racial isolates in Eastern United States. Acta Genet. 6:410, 1956/7.

34. Witkop, C. J. Hereditary defects in enamel and dentin. Acta Genet. 7:236, 1957.

35. Neel, J. V. Genetics and human congenital malformations. Pediatrics 19, Part 2:749 April 1957.

diet and disease are important factors in the statistics of malformations among various peoples; a detailed study of parents of affected children, and detailed studies of similarities among siblings with a given defect.

Fraser,[36] in search of etiologic factors in cleft lip and cleft palate, found that mothers of such children demonstrated a higher frequency of pathologic conditions in the reproductive tract.

CONCLUSIONS

The evidence now available stresses the multiplicity and inter-relatedness of etiologic factors as well as the variety of developmental mechanisms involved in the production of congenital malformations.

36. Fraser, F. C. Etiological factors in clefts of the palate and lip. Acta. Genet. 7:229, 1957.

RESEARCH AND EDUCATION

Paul E. Boyle, D.M.D., Cleveland

Research is concerned with the acquisition of knowledge. Education is the process by which knowledge is passed on to succeeding generations. Volumes have been written on the subject, and it has challenged superior minds from Plato and Aristotle to Whitehead and Hutchins. The primary concern of this report is the relation of research to education and its bearing on dentistry, including its specialty groups. A brief comment on education in general may be in order before discussing research and the mutual relation of one to the other.

In embryology, the statement "ontogeny recapitulates phylogeny" concisely summarizes the complex processes of development. A single cell multiplies, grows, and differentiates, passing through stages reminiscent of ameba, coelenterate, fish and reptile, before finally assuming recognizable human form. Education is another complex process through which the squalling infant and the rebellious child become adult, mature members of society.

The momentous changes in the first few weeks of intra-uterine life are more important than anything occurring later in physical development. In much the same way, experiences in infancy and early childhood are of major significance in the evolution of behavior patterns and emotional characteristics. It is meaningful to the dental profession that one of the most important instincts of a newborn baby is concerned with the mouth. Suckling, contact with the mother and through her with the outside world are functions of a primitive part of the brain. The sucking reflex is found even in anencephalic monsters.

In these formative years the child's relation to his mother is paramount. School involves adjustment to a larger circle of adults as well as to others of the same age group. The success with which these adjustments are made depends on the environment, the skill of the teacher and, most of all, on the early experiences of the child. Undue aggressiveness, anxiety, over-dependence, or other behavior problems may first manifest themselves at this stage of education, though their roots lie in infancy.

The American ideal of equality of opportunity led to the establishment of public schools. This was a major change from Europe where education was a

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privilege reserved for the children of the wealthy and for charity scholars. In America the next step was the enactment of laws requiring school attendance of all children until a specified age. This requirement, however well-intentioned, has made further problems. When force is applied there is a counter-reaction; and resistance to education, even in professional schools, is a familiar phenomenon. Faculty members who feel they must compel the students to learn only make matters worse.

We now have obligatory attendance at school, the 30-week school year, a preponderance of women teachers (mostly spinsters) and lock-step systems of education with automatic promotions on the basis of age instead of achievement. With the rapid increase in population and in national income, public attention is belatedly focused on these problems. They are very important ones to those of us in professional education, since it is chiefly the products of the public school with whom we are concerned in the selection of our trainees for the profession of dentistry.

American colleges and universities are of varying sizes and traditions. They range from well-endowed private or state-supported institutions with world famous faculties to those that are inadequately supported and staffed. Junior colleges, fairly new on the scene and rapidly increasing, offer a two-year educational program after the high school. The cost of higher education in excess of the tuition and other fees paid by the student is underwritten in various ways. There are religious or other sectarian contributions, tax revenues, contributions from alumni or the community, endowments supplemented by federal or state grants, and grants from educational foundations. The report of the President's Commission on Education Beyond the High School states that more than a billion dollars a year is being spent on such support with no over-all plan.

Academic standards in teaching and in research may vary considerably in the different departments of a single university, to say nothing of standards in different universities and colleges. In England and on the continent, educational standards are much more uniform. It has been estimated that the average pupil entering a university is as well educated as an American student after two years of college, and the holder of the Master's degree from a European university compares favorably in educational accomplishments with the holder of a Ph.D. degree from an American university. The range in quality of education in America is large, however, and there is no doubt that many superior students trained in our best universities and colleges are comparable to the products of European institutions.

The basic difference between the continental system, which Russia has also followed, and our own program is that in Europe only superior students are permitted to continue with higher education. In this country a large percentage of intellectually superior students, particularly from families with low incomes, do not continue with their education beyond the secondary school. On the other hand, many inferior students do go to college, and, after the requisite four-year period, may graduate with a Bachelor's degree. Social and economic factors play a large role in this selection of college material. Colleges vary greatly in their popularity, hence in their ability to be selective. Many state-supported schools are required by law to accept all graduates of the secondary schools in that state. They must then eliminate the unfit by an expensive and wasteful process.

Dental schools are in the fortunate position of having approximately two qualified candidates who request admission for each available space. Selection is made on the basis of college grades, suitable recommendations, and interviews, along with the evidence of ability and

achievement afforded by the American Dental Association Aptitude Test. Psychology has been utilized extensively in the development of testing devices to estimate the fitness of applicants. Psychologists say that in large scale testing of business executives they find a minimum basic level of intelligence in common, but beyond that, no correlation between intelligence and success. There is some indication that this is true also in professional schools. Given satisfactory intellectual ability, factors such as motivation and the ability to work with others become important for success in dental school and in the subsequent practice of dentistry.

The age at which students enter dental school and the number of semester hours of college credit presented has been increasing. The requirement of a Bachelor's degree as a prerequisite for admission has been discussed among dental educators. I feel these are unfortunate tendencies. Medicine is already finding itself being "priced out of the market." Johns Hopkins University has announced a five-year program, admitting students after two years of college. It is planned to make use of a 48-week academic year and to include a rotating internship year before granting the M.D. degree, thus making it possible to train physicians in a seven-year period after the high school.

The four years leading to the D.D.S. degree has remained fixed for a generation, whereas the amount of specialized knowledge to which the student is exposed has increased enormously. Traditionally the dental student receives sufficient clinical training so that he is graduated as an experienced dentist equipped to start general practice. Actual increases in the length of the training period have occurred through internships or through post-D.D.S. training programs. As specialists are brought into the faculty, departmentalism and separation tend to develop. The more efficiently the various specialists can work together with mutual understanding of one another's role, the more students and patients will benefit.

Anatomy and pathology are now a recognized part of education for the professions concerned with health services. They faced stubborn opposition for long periods before they were accepted. Physiology, biochemistry, and microbiology were bitterly opposed by leading practitioners of dentistry and medicine down to quite recent times. Now psychology, and latterly, sociology meet with inertia or active opposition. Yet it appears that their place in the education of the future will be comparable to that of the physical sciences, now at last firmly established.

Research has become a badge of respectability. Individual curiosity, the scientist who works because of his own interest and drive, has given way to a highly organized and financed, big-business type of research. Progress is made by asking the right questions and using all the technics of chemistry, biology, physics, or mathematics to answer them. Applied physics has revolutionized the practice of dentistry. Applied microbiology, anatomy, physiology, and pathology are essential to all the health specialties. No less important are problems in human relations, upon which psychologists have been working for at least 50 years and to which sociologists are now turning their concentrated attention. Research in these fields will play an ever increasing part in the dental education of the future.

DENTAL ABSTRACTS: THEIR VALUE TO THE BUSY DENTIST

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Although sputniks and supersonic missiles have centered the world's attention on science, man's interest in scientific research is far from new. That fact is evidenced by the tremendous technological developments which have occurred in this country and which have made America great.

Within the space of one generation America sped from the horse and buggy to supersonic jet travel. It moved from muddy country roads onto a nationwide network of concrete highways. It harnessed the atom, electrified the farms and made television a necessary way of life. It brought most dread diseases under control and initiated a change in the viewpoint of medicine from one of cure to one of prevention. It brought health service into the lives of millions of people through prepayment and postpayment plans and, through governmental and industrial pensions, it guaranteed comfort for the aged.

Developments in dental science have been no less remarkable. Acrylic resins have replaced vulcanite rubber and challenged porcelain and other restorative materials. High-speed cutting instruments —the air abrasive, the ultrasonic devices, the water-driven and air-driven turbines —are displacing the slow rotary handpiece. Improvements in x-ray film and equipment—high kilovoltage, better collimation, filtration and timers—are revolutionizing roentgenography. The antibiotics have improved the practice of oral surgery and other dental operative procedures. Improved endodontal and periodontal technics permit the saving of teeth formerly considered unsavable. Prepayment and postpayment plans, group practice, hospital dental service and the increased use of auxiliary personnel foreshadow many changes in the practice of dentistry tomorrow.

These improvements in dentistry, like improvements in other fields of human endeavor, have been contributed by many researchers from many lands. No one nation, no one discipline, has a corner on these contributions, nor a corner on their use. It is a matter of professional pride for a scientist to put his findings into print as soon as possible for the benefit of others.

Currently, research reports and other articles dealing with various phases of dentistry are published in some 400 journals—dental, medical, chemical, biological, nutritional and others. Obviously it is impossible for a busy dentist, whether he is a general practitioner, a specialist, a teacher or a researcher, to have access to—much less read—the contents of 400 current periodicals. It is equally obvious, however, that the dentist who is determined to keep abreast of developments in his profession must do so through the pages of the professional literature. Such informational service is provided by the American Dental Association through its latest periodical, *Dental Abstracts*.

Although *Dental Abstracts* was not launched until 1956, the need for such a publication had long been recognized. Thirty years ago—in 1928—the first commision on journalism of the American College of Dentists recommended the creation of a dental abstract journal.[1] Since then at least four dental abstract or

Editor in chief, the American Dental Association.

1. Report of committee on journalism, American College of Dentists. J. Am. Col. Den. 23:13 March 1956.

digest journals have come into being but all were short-lived.[2-5]

Despite these casualties, however, the need for a dental abstract publication exists and, in fact, will grow greater with each passing year as dental research grows greater in volume and dental reports and publications grow greater in number.

For example *The Index of the Periodical Dental Literature Published in the English Language* covering the years 1896 to 1900 consisted of a volume of 591 pages covering 87 publications in England, Canada and the United States. About 118 pages were required to index a year's output of dental literature in the English Language. *The Index to Dental Literature in the English Language* covering the year 1956 was a tightly-organized volume of 243 pages covering 159 publications, including 148 English-language periodicals from Australia, Canada, England, India, New Zealand, Pakistan, Philippines and the United States. Articles in English appearing in journals from Burma, Egypt, Lebanon, Norway, Puerto Rico, South Africa, Sweden, Switzerland and in the *International Dental Journal* also were included.

It can be estimated conservatively that the volume of dental literature has at least doubled since 1900 and all signs point to a continuing rise. More dental schools throughout the world are being opened each year. The volume of scientific dental research is rising, especially in the advanced countries. The number of dental students and of dental graduates is increasing.

The 1956 volume of the *Index to Dental Literature* covered 4,615 articles, not including 247 book reviews, 666 obituaries and 141 editorials. Assuming that a conscientious reader required 30 minutes to read each article, and that he read eight hours a day, five days a week, with no time out for lunch, holidays or vacations, it would require one year and five weeks to read this literature. Still to be read would be the dental literature not available in the English language such as the dental literature from France, Germany, Japan, Latin America, Italy, Spain, Russia and the Scandinavian countries.

These figures are mentioned only to point out the absurdity of any attempt on the part of a single scholar to read the literature of his field.

This estimate of the reading time for the world's dental literature may be compared with the estimate made by Maurice B. Visscher in 1956 that "to go over the physiological literature published in 1940 would require two years and 70 days."

It must be repeated that it is not safe for the dentist or the dental research man to assume that by reading a small fraction of the dental and allied journals he will avoid missing important new facts. Occasional scientific papers reporting new information of interest to dentists appear in scores of journals in the basic sciences, medical, nutritional, metallurgical, roentgenological and other fields.

No one person can cover the growing field of dental research. No one should be expected to devote a disproportionate amount of time to keeping abreast of the dental scientific literature. The job has to be done for him.

Today the job is being done by such annual indexes to dental literature as those published by the American Dental Association and the Argentine Dental Association, and by the Association's *Dental Abstracts*.

Established in January 1956, *Dental Abstracts* has become the leading abstract journal in the field of dentistry throughout the world. It performs its function so well that the Excerpta Medica publishing enterprise does not attempt to enter the dental field. *The Current List of Medical*

2. Dentistry, a digest of practice. J. B. Lippincott Co., Philadelphia 1940-47.

3. The British dental digest. The British Dental Digest Ltd., London 1947-49.

4. Dental abstracts. Columbia University School of Dental & Oral Surgery, New York 1947-1950.

5. A digest of dental science. D.D.S. Publishing Corp., New York 1952-53.

Literature has discontinued its coverage of foreign dental journals.

Frank B. Rogers, director, National Library of Medicine,[6] reported recently:

> We have . . . cut back our coverage of dental literature. From the beginning it has been our policy to avoid duplication with other indexing efforts as much as possible. Since domestic dental literature was covered by the *Index to Dental Literature*, we have never attempted to cover this field in the *Current List*. But we did include fairly wide coverage of foreign dental journals until recently. Now with the advent of *Dental Abstracts*, a periodical résumé of the foreign dental literature published by the American Dental Association, we have given up our efforts in this area entirely. . . .

Saul Herner,[7] writing on "Technical Information—Too Much or Too Little" said:

> In 1950 there were something like 50,000 serial publications in science and technology, which were producing about 1,850,000 articles and papers a year. We in the U. S. are producing about 150,000 unpublished research reports annually in connection with government-sponsored research.
>
> It is not surprising . . . that our supply of technical information has grown; everything else has. During the past 15 years, our national dollar income has more than quadrupled; the number of scientists and engineers in the United States has more than doubled; and the number of scientific and technical students in our colleges and universities has more than doubled. Our national research budget is more than six times as large as it was in 1940.

Dr. Paul B. Sears,[8] immediate past president of the American Association for the Advancement of Science, stated in his presidential address before that body last December 28: "With a population set to double in less than half a century . . . with each individual making growing demands, moving faster and further by a factor of at least ten we have on our hands a program without precedent in geological history."

The problem which Dr. Sears sees facing the nation also faces the dental profession. With the growing number of dental schools, dental students and dental researchers plus the increased national budget for dental research it is not unlikely that dental scientific investigation may multiply in the near future by a factor of ten, and the publication of the reports of such research will be increased by a like amount.

6. Rogers, Frank B. Trends in medical abstracting and indexing tools. Bul. M. Library A. 44:397 Oct. 1956.

7. Herner, Saul. Technical information—too much or too little. Scient. Mthly. 83:82 Aug. 1956.

8. Sears, Paul B. The inexorable problem of space. Science 127:9 Jan. 1958.

Science and Religion • As knowledge advances, science ceases to scoff at religion; and religion ceases to frown on science. The hour of mockery by the one, and of reproof by the other, is passing away. Henceforth, they will dwell together in unity and good will. They will mutually illustrate the wisdom, power, and grace of God. Science will adorn and enrich religion; and religion will ennoble and sanctify science.

Science—in other words, knowledge—is not the enemy of religion; for, if so, then religion would mean ignorance; but it is often the antagonist of school doctrines on divinity. *Oliver Wendell Holmes.*

Occlusal equilibration of the dentition

Marvin Simring, D.D.S., Brooklyn

The aims of occlusal equilibration include improvement in the following: (1) masticatory function; (2) temporomandibular joint and musculature function; (3) comfort; (4) esthetics; (5) phonetics; (6) tissue stimulation (relative to the age of the patient); (7) trauma (prevention or relief or both), and (8) oral sanitation (by elimination of food impaction).

Many of these aims are closely interrelated. Thus improved masticatory function (resulting from eliminating occlusal interference) will provide comfort, improved muscular function, superior tissue stimulation and relief of trauma as well as prevention of future trauma.[1-3]

A detailed technic for equilibration of the occlusion is described in the leading textbooks of periodontics.[4-7] This technic has successfully stood the test of time in about 100,000 instances over more than 30 years. It aims to achieve the following mechanical factors: (1) freedom from interference and (2) simultaneous contact on as many teeth as possible, grouped close together, in the functional positions and excursions of the mandible.

RELATION BETWEEN GRINDING AND NATURAL WEAR

Equilibration of the occlusion may be achieved through prosthetic restoration, orthodontic procedures, surgery, selective grinding, natural wear or a combination of these methods. The relation between natural wear and selective grinding is significant because the two processes may aid each other, or offset each other's shortcomings, or they may hinder the attainment and maintenance of equilibration.

THE WEAR FACET

Minor irregularities and discrepancies between upper and lower teeth generally are resolved by wear soon after the teeth erupt into the mouth. Thus minor interferences to effective occlusion are eliminated naturally as the first wear facets form. The "wear facet"[8] is one of the earliest signs of wear of the dentition. It appears as a flat, shiny, clearly demarcated area on the convex surface of a tooth (Fig. 1, above left). This natural "grinding in" of the youthful dentition

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1. Report of evaluating committee IV. Treatment of periodontal disease. J.A.D.A. 45:26 July 1952.

2. Miller, S. C. Periodontist's view of occlusion. J. D. Med. 5:66 July 1950.

3. Sorrin, Sidney. Interrelationship of occlusion and periodontal structures. J. D. Med. 11:158 July 1956.

4. Miller, S. C. Textbook of periodontia, ed. 3. Philadelphia, The Blakiston Co., 1950.

5. Glickman, Irving. Clinical periodontology; the periodontium in health and disease. Philadelphia, W. B. Saunders Co., 1953.

6. Beube, F. E. Periodontology; diagnosis and treatment. New York, Macmillan Co., 1953.

7. Goldman, H. M.; Schluger, Saul, and Fox, Lewis. Periodontal therapy. St. Louis, C. V. Mosby Co., 1956.

8. Weinberg, L. A. Diagnosis of facets in occlusal equilibration. J.A.D.A. 52:26 Jan. 1956.

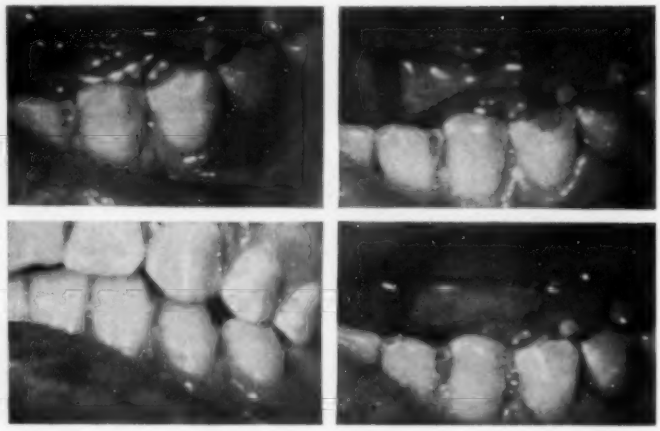

Fig. 1 • Above left: Wear facet. Above right: Periphery of facet outlined by rubbing pencil over it. Below left: Harmonious relation of facet to opposing teeth in lateral excursion before grinding. Faceted tooth as well as adjacent teeth make uniform simultaneous contact. Below right: Facet adjusted by grinding. Note remains of pencil mark at cusp edge

permits greater masticatory efficiency. Yurkstas,[9] Manly[10] and Curby[11] have demonstrated this increase in efficiency (in pulverizing peanuts) as the food platform area of the teeth increases.

As wear continues, the initial value of this wear of interferences is soon counteracted by inefficiency resulting from lost cusp sharpness.[4] Greater masticatory muscular force must be applied in order to achieve the accustomed degree of trituration of food. Furthermore, as the cusps are worn down, the effective occlusal surface area becomes broader. This increased buccolingual tooth width permits strong torque production in the periodontal membrane[12] which may produce trauma, if resistance of the periodontal tissues fails.[13] The increased muscular tension and increased periodontal torque (due to the width of the teeth) are further encumbered by increased friction resulting from increased areas of interocclusal contact. Since friction varies directly with the size of the contacting areas, lateral mandibular glides on severely abraded teeth will produce strong lateral frictional stress which may be traumatogenic.

Correction of abnormal wear is one of the important considerations in the procedure for equilibration of occlusion. The wear facet is corrected in such a manner that the advantage of decreased interference will be retained or augmented while the lost cusp sharpness will be recouped.[13-15]

The procedure is as follows: The facet is observed carefully on the study cast and in the mouth (Fig. 1, above left). A pencil rubbed over the facet will clearly delineate the sharp ring at the periphery, the abrupt change in tooth contour from convex to flat (Fig. 1, above right). For

9. Yurkstas, Algirdas, and Manly, R. S. Measurement of occlusal contact area effective in mastication. Am. J. Orthodont. 35:185 March 1949.

10. Manly, R. S. Factors affecting masticatory performance and efficiency among young adults. J. D. Res. 30:874 Dec. 1951.

11. Curby, W. A. Simplified instrument for measurement of food platform area. J. D. Res. 32:328 June 1953.

12. Simring, Marvin. Dynamic models for patient education. J.A.D.A. 44:522 May 1952.

13. Sorrin, Sidney. Traumatic occlusion: its dectection and correction. D. Digest 40:170 May; 202 June 1934.

14. Malsky, Maurice. Occlusal impact. (Its relation to preliminary grinding.) J. D. Med. 8:24 Jan. 1953.

15. Weinberg, L. A. Visualized technique of occlusal equilibration. J. D. Med. 7:9 Jan. 1952.

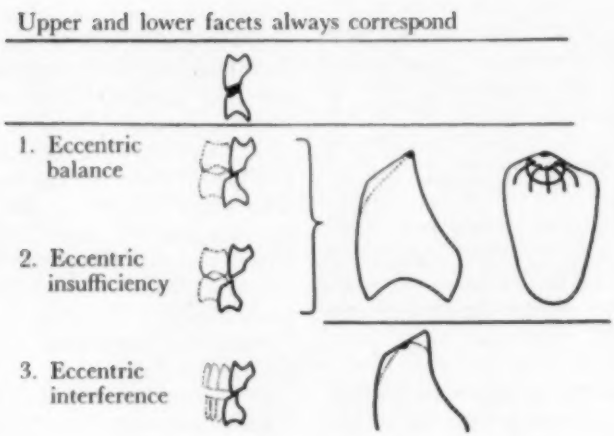

Fig. 2 • Correction of the wear facet as a part of preliminary grinding. 1, height of cusp is retained when there is harmony in excursive movement. 2, height of cusp is retained when there is insufficiency in mandibular excursion. 3, height of facet is reduced when it interferes in mandibular glide

every facet on a lower tooth, a corresponding facet exists on the upper opponent. These are studied in order to determine the mandibular glide in which these facets were formed. The aim is to alter two flat planes into a "cusp-against-plane" contact. Grinding is limited to those facets on the buccal aspects of lower buccal cusps and the lingual aspects of upper lingual cusps. These are restored to their original convex cusp form (Fig. 1, below right), whereas the plane surface of the corresponding opposing facet is retained as the guiding incline at this stage of the grinding. The height of the cusp is retained in these instances:

1. When there is harmony with the adjacent teeth (simultaneous contact) in the mandibular glide in which the facet formed (Fig. 1, below left, and Fig. 2).

2. When there is insufficiency (lack of contact) of the facet in that mandibular glide.

The height of the facet is reduced only when it interferes with other occlusal contact during the mandibular glide; such a cusp would also probably extend beyond the occlusal plane. Lower anterior teeth frequently are in this latter category (Fig. 2).

Wear facets which form on the lingual slopes of lower buccal cusps correspond to those on the buccal slopes of upper lingual cusps. These could not be ground without altering the cusps or grooves involved in the maintenance of centric occlusion. Therefore, these facets are not altered unless they interfere in a particular situation (Fig. 3). These facets are formed in either centric closure, protrusive excursion or balancing lateral excursion.

An interference in centric occlusion is indicated by perforation of a sheet of 30 gauge, soft, green casting wax adapted to the mandibular teeth (Fig. 4). A large number of perforations scattered throughout the mouth indicate that the wax was too soft or that the patient kept his mouth closed too long or too tight. A new wax record should be taken. If two consecutive records indicate the same few points of interference, it may be concluded that the perforations are not artifacts and that they represent actual interferences.

Fig. 3 • Rampant facets (extreme wear). Facets formed on lingual slopes of buccal cusps of lower teeth and facets on buccal slopes of upper lingual cusps. In this instance grinding is avoided unless there is occlusal interference in some mandibular movement

When grinding to eliminate interference, the goal of centric harmony is indicated by compression of the wax record to a fairly uniform unperforated thinness throughout the mouth. The exact site of an interference may be noted by marking through the perforation with indelible pencil in the mouth or on the cast (Fig. 4, left) to which the wax record may be readapted. Articulation paper is used to confirm and locate in the mouth the exact sites of interference indicated by the wax perforation. The interfering spots are frequently marked by a ring formed by the expressed articulation ink. The effectiveness of the articulation paper in marking may be enhanced by applying a thin coat of cocoa butter to the paper immediately before use. Teeth should be dried, and the paper may be warmed.

The choice whether to grind the upper or lower cusp interfering in centric occlusion is based on its role in excursive movements. Interferences in centric occlusion that are also interferences in later excursions must be reduced. A cusp that interferes in centric occlusion but does not interfere in excursions should be retained and the groove deepened instead. An exception might be considered in "locked" (steep cusp incline) occlusions where the general aim is to reduce the steepness of cusp inclines. In the latter instance the dentist might avoid deepening an already deep groove and instead reduce the cuspal height even though the inteference exists only in centric position.

If the interference occurs in one of the mandibular excursions, it must be ascertained whether the interfering facets are also involved in centric occlusion. This is readily accomplished with 30 gauge, soft, green casting wax and articulation paper (Fig. 5). If an interference appears on the balancing side, it may be located specifically by having the patient close in centric occlusion with articulation paper interposed between upper and lower teeth. The patient is then instructed to glide into the disturbed lateral excursion and, when the jaws are opened, the balancing side is observed for long streak markings (Fig. 5, left). If there is any doubt, a strip of the wax is adapted to the mandibular teeth. The patient closes in centric occlusion, glides into the disturbed relation and opens. The wax is chilled, carefully removed and observed for perforation (which may indicate interference.) This record is best compared with another similar wax record of centric closure alone.

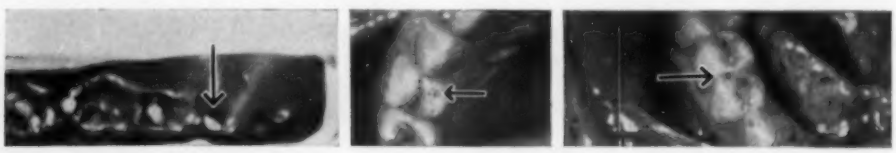

Fig. 4 • Left: Centric interference indicated by perforation of sheet of soft casting wax adapted to mandibular teeth. Wax readapted to study cast for locating and deciding exact site of correction. Center and right: Articulation paper markings confirm exact sites of interference indicated by wax perforation

If blue articulation paper is used to locate the balancing interference, the patient should also be asked to close on it and move the mandible to both right and left. Thus both right and left lateral markings are obtained. These are examined and a different colored articulation paper (red) is then interposed and the patient is asked to close into centric occlusion only. Where a facet has formed, the red mark may partly or completely cover or obliterate the blue mark of the interference on the balancing side (Fig. 5). In this instance, the dentist is confronted with the necessity of sacrificing a functional (centric) contact in order to eliminate interference (on the balancing glide).[16] Where interference occurs on the balancing side along cusp inclines which are in harmonious contact in centric occlusion, it beomes necessary to sacrifice some of the centric contact in order to eliminate the balancing interference.

In such instances the choice as to whether to grind an upper or lower cusp is based on the markings in working excursion. If they prove that the lower buccal cusp is in harmony in working excursion (as indicated by a blue streak on an upper buccal cusp's lingual slope), then this lower buccal cusp is retained and the upper lingual cusp is ground along its buccal slope (Fig. 5, above right). If a blue streak is found on the lower lingual cusp's buccal slope but not on the upper buccal cusp's lingual slope, then the lower buccal cusp is not

16. Schuyler, C. H. Correction of occlusal disharmony of the natural dentition. New York D. J. 13:445 Oct. 1947.

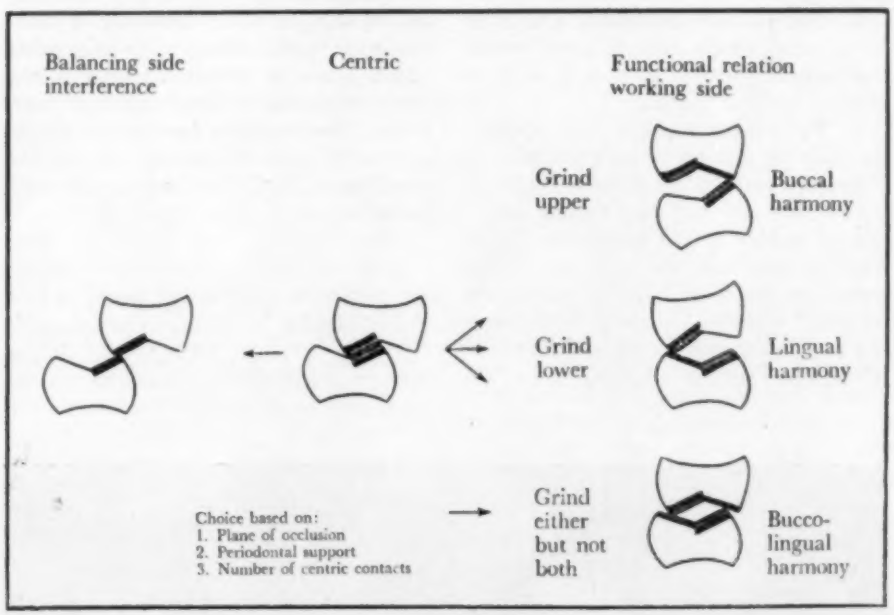

Fig. 5 • Determination of where to grind by interpretation of articulation paper markings in balancing side interference coinciding with site of harmonious centric contact. Heavy black line represents initial blue articulation paper markings obtained in right and left mandibular excursions. Hatch marks represent red articulation paper markings superimposed on blue by a follow-up closure in centric occlusion only

in contact on the working side and may be ground (Fig. 5, center right). In short, when correcting balancing glide interference, the dentist sacrifices that centric contact which is not needed for working glide harmony; he retains that cusp which is in function in both centric occlusion and working glide. If blue streaks are found on both the lower lingual cusp's buccal slope and the upper buccal cusp's lingual slope or on neither, then a choice must be made to grind one but not both centric contacts (Fig. 5, below right).

This choice is based on the following factors:

1. The number of centric contacts. Generally, a tooth (such as an upper third molar) with but one point of centric contact should not be disoccluded by grinding that one point, for the tooth may become supracluded into its original malposition.

2. The plane of occlusion. The interfering cusp which extends most beyond the occlusal plane is ground in order to achieve occlusal harmony.

3. Periodontal support. The interfering cusp of that tooth most severely involved by periodontal disease is ground.

Grinding only one cusp retains centric contact at cusp height and groove depth. This is favorable for the periodontal tissues because of the stability of vertically directed stresses. Grinding both cusps has been advocated by some.[17] However, it permits centric contact along the middle of a cusp incline. Horizontal forces which result may prove traumatic or may cause migration and drifting of teeth.[18] Thus it is essential that only one and not both cusps be ground.

The technic I use involves elimination of interference while retaining most (and sacrificing least) functional contact.

The use of two colors of articulation paper to distinguish centric contacts from excursive contacts may be utilized not only in instances of wear but in all occlusal equilibration.[19] It provides a scientifically controlled method for visualizing occlusal contacts and simplifying the interpretation of markings.

ADVANCED WEAR

Advanced wear does not necessarily imply an extension and coalescence of "wear facets" (Fig. 3) to form the broad, flat occlusal surfaces shown in Figure 6 to 8. To be sure, in many instances of bruxism, such teeth, without cusps or grooves, result, when wear has involved almost every contacting occlusal surface of every tooth. The resultant mechanical strains generally produce severe periodontal traumatism. Such conditions are best adjusted by:

17. McLean, D. W. Pathologic occlusion: a major clinical problem. J.A.D.A. 31:1587 Dec. 1944.

18. Coleman, R. E. Equilibration of occlusion in orthodontics. Am. J. Orthodont. 34:791 Oct. 1948.

19. Madsen, B. C. Diagnosis and correction of functional malocclusion. New York J. Den. 26:5 Jan. 1956.

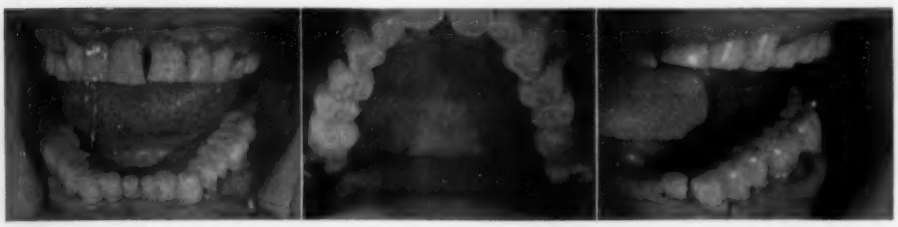

Fig. 6 • Broad, flat occlusal surfaces due to tooth against tooth friction in patient with bruxism. Dentin is exposed but not appreciably cupped out

1. Narrowing and rounding in buccal and lingual margins (Fig. 3).
2. Rounding off sharp ridges which may act as "plunger cusps."
3. Recarving occlusal grooves and sluiceways.

Thus the following factors are eliminated:

1. Laceration of soft tissues (lips, tongue and cheek).
2. Impaction of food.
3. Traumatic effects of large, inefficient interocclusal contacting areas, broad buccolingual tooth diameters and extreme frictional grip of expansive contacting areas.

For each individual patient the extent of such occlusal adjustment must be related to the degree of improvement required in the factors listed. Thus in these instances of advanced wear the amount of buccolingual narrowing should be related to the degree of trauma as evidenced by injuries to the attachment apparatus of the tooth, widening of the periodontal membrane space, mobility, gingival bleeding on arising, "soreness" of the teeth on arising, thermal sensitivity, an increasing difficulty in mastication and so forth.

Advanced wear may be caused by the following (Fig. 9): (1) bruxism; (2) abrasive foods and (3) acid foods.

The broad flat contour of bruxism has been described, its hazards listed and its correction discussed.

When vigorous mastication of abrasive foods[20] is a principal cause of wear, there occurs a selective wear. "Cupping"[21] of the dentin, exposed by the wear, results in a characteristic pattern resembling the teeth of a herbivorous animal (Fig. 10, above). When acid foods (fruits) are a significant factor, the pattern is modified further by a rounding off of the enamel ridges surrounding the cupped-out dentin (Fig. 9, right).

This cupping of the dentin is not due to the opposing cusps. Soft black wax placed into one of these "cupped" out

Fig. 7 • Occlusal surfaces of study casts of patient with wear associated with bruxism

areas cannot be removed by any chewing or gritting motion that the patient can perform (Fig. 10, below). Retention of the wax indicates that the depth of the "cup" was not involved in any occlusal contact. It therefore must have been produced by the selective wear from the interposed food bolus.

This cupping of the dentin, which results from a functional masticatory wear, reduces the size of the interocclusal contact areas with its attendant stressor aspects. Some of the occlusal stress is also dissipated in the wearing away of the relatively soft dentin. As might be expected, many patients exhibiting the occlusal pattern of functional masticatory wear are relatively free of evidences of traumatic occlusion (Fig. 11-13). On the other hand, the intense and nonintermit-

20. Begg, P. R. Stone age man's dentition. Am. J. Orthodont. 40:298 April; 373 May; 462 June 1954.

21. Williams, C. H. M. Correction of abnormalities of occlusion. J.A.D.A. 44:748 June 1952.

tent stresses of bruxism and its traumatogenic wear pattern frequently induce periodontal traumatism (Fig. 8).

The "cupped out" occlusal form may be considered a normal physiologic gerontal occlusal anatomy and requires no special adjustment. Jankelson[22] has stressed additional values of dietary wear:

1. Abrasive narrowing of the teeth.

2. Offsetting mandibular advance by permitting continuous eruption in the absence of bruxism. Mandibular advance may result from loss of vertical dimension when normal continuous eruption is prevented by the stresses of bruxism. This mandibular advance and loss of vertical dimension frequently results in overloading the anterior teeth as well as flaring of the upper anterior teeth or temporomandibular joint disturbance or both.

EQUILIBRATION OF OCCLUSION

It is thus apparent that occlusion is not static throughout life and that its form may change physiologically or pathologically. Therefore, annual periodontal examination and evaluation of the occlusion should be routine office procedure, for a given occlusion may show evidence of both bruxism and masticatory wear.

Selective Grinding • Equilibration of the occlusion by grinding is one significant means for directing a physiologic develop-

22. Jankelson, B. Physiology of human dental occlusion. J.A.D.A. 50:664 June 1955.

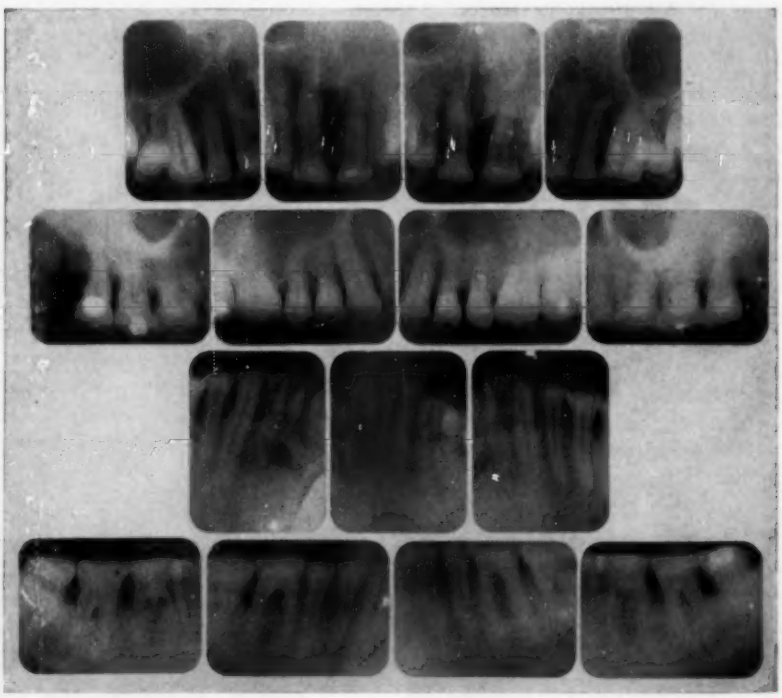

Fig. 8 • Roentgenographic series indicates periodontal pathosis in which traumatism may have played a role

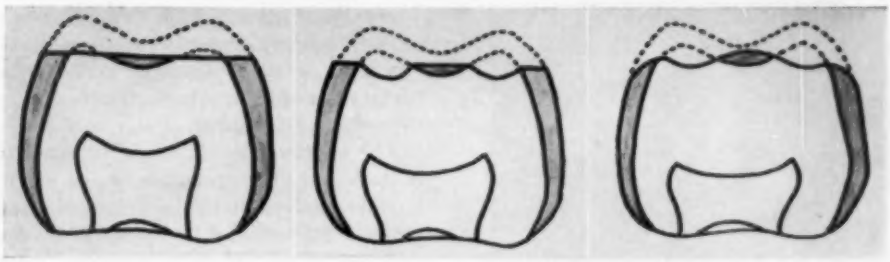

Fig. 9 • Tooth forms resulting from various causes of wear. Left: Bruxism. Center: Abrasive foods. Right: Acid foods

ment of the occlusion by permitting uninterfered function in all mandibular positions and excursions and by permitting wear to take place evenly. Children with malocclusion possess lower average biting forces than those with normal occlusion.[23] This diminished function may fail to stimulate adequate bone formation and permit traumatism to ensue in later life. Furthermore, the initiation of physiologic wear may be delayed. In addition, steep cusp inclines which limit mandibular function induce uneven wear which may disrupt an occlusion and result in open contacts, steep cusp formation[24] and migration and drifting of teeth. Beyron[25] has shown that equilibration of occlusion generally can prevent and frequently can resolve such sequelae of unilateral mastication and other limited inadequate function.

Furthermore, clinicians have long known that equilibration of occlusion occasionally appears to break a habit of nocturnal bruxism[26] and clenching (or at least render it inaudible). Jankelson[22] presented the interesting and plausible explanation that the muscular constriction and binding of a "locked" occlusion provoke bruxism. "Freeing" the bite by grinding the interfering areas eliminates the need for muscular "rebellion." Unquestionably, bruxism generally has a profound psychosomatic basis and cannot always be eliminated so simply.[27] Nevertheless, equilibration of occlusion will generally ameliorate some of the traumatic strains of bruxism. In this regard, it is essential to polish carefully all ground tooth surfaces in order to prevent frictional binding which may initiate bruxism in some patients.[28] This can be accomplished most effectively by "selective surfacing."

Selective Surfacing • Selective surfacing is a technic for refining and extending the range of equilibration of occlusion. Selective surfacing aims to overcome the following shortcomings inherent in selective grinding:

1. Thick, easily marking articulation paper is of value in eliminating gross interferences rapidly, but fails to distinguish fine differences in contact between various teeth.

2. Coarse abrasive stones and wheels are of value in eliminating gross interferences rapidly; however, two limitations develop:

a. Stones cannot be controlled carefully as to the exact amount of tooth abraded.

23. Yurkstas, A. Effect of masticatory exercise on the maximum force tolerance of individual teeth. J. D. Res. 32:322 June 1953.

24. Ogle, M. W. Traumatic occlusion and mandible repositioning. J.A.D.A. 48:527 May 1954.

25. Beyron, H. L. Occlusal changes in adult dentition. J.A.D.A. 48:674 June 1954.

26. Strother, E. W., and Mitchell, G. E. Bruxism: a review and a case report. J. D. Med. 9:189 Oct. 1954.

27. Moulton, R. Oral and dental manifestations of anxiety. Psychiatry 18:261 Aug. 1955.

28. Bless, J. L. Occlusal equilibration in periodontal treatment. New York D. J. 22:121 March 1956.

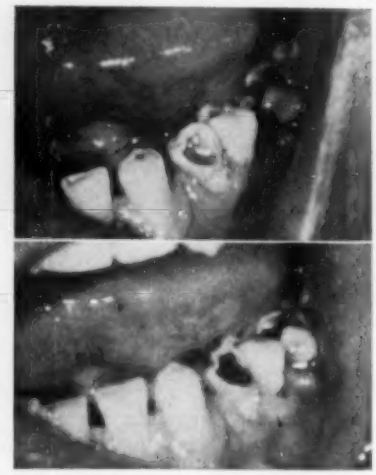

Fig. 10 • Above: Lower left first bicuspid exhibits "cupped out" region of eburnated dentin with rim of harder enamel. Below: Soft black wax was placed in cupped out region, and patient was asked to chew and glide mandible in various directions

b. Stones produce a rough irregular tooth surface after grinding.

In the wake of selective grinding, these shortcomings may produce traumatic tripping, frictional strains and binding which occasionally induce bruxism. Selective surfacing is selective polishing through a series of graded abrasives and graded articulation papers to achieve free, uninterfered, equilibrated, low-friction mandibular glides.

The selective surfacing technic is instituted after the completion of equilibration of occlusion by selective grinding. Although diamond abrasives may be used to initiate the selective grinding, fine carborundum stones and wheels should be used to complete it prior to selective surfacing.

Tissue-thin blue articulation paper is used. Although the teeth are dried, this paper should not be heated because marking of any but the grossest interference is to be avoided. Markings are obtained in the mandibular glide which has just been equilibrated by grinding. These markings are then polished carefully with a medium-grit rubber abrasive polishing wheel. Polishing and slight further equilibration thus are achieved by this selective polishing.

The operator should relate the amount of polishing to the intensity of the mark. Further differentiation of intensity of occlusal contact can be achieved by examining the articulation paper for tears and perforations which represent interferences just as they did in the thin green casting wax sheets. Initially, the tissue-thin articulation paper can be marked with a cut adjacent to a given tooth (for example, the first bicuspid or midline between the central incisors) in order to orient the paper so that the tooth location of a paper perforation can be ascertained. Such perforation-marked interferences may need additional polishing with the medium-grit polishing wheel or they may need to be touched up lightly with a fine carborundum abrasive wheel.

Marking with the tissue-thin articulation paper and selective polishing with the medium-grit rubber abrasive polishing wheel usually is repeated a second time. Then the procedure is repeated twice again substituting a fine-grit rubber abrasive polishing wheel. This procedure of selective surfacing occupies only a few minutes, but provides the patient with immediate comfort that will be long lasting.

GUIDING NATURAL OCCLUSAL DEVELOPMENT

The dentist has further control over the physiologic development of his patients' occlusion. Dietary instruction should stress the daily ingestion of several portions of raw fruits and raw vegetables as part of the basic seven foods advocated by the food and nutrition board of the National Research Council.[29,30]

The dentist may also instruct his patient in proper mastication. The technic of mastication appears to have profound

psychosomatic significance. Advice aimed at achieving proper masticatory function for dental patients might be like that used by Perls, Hefferline and Goodman[31] in their gestalt (psychosomatic) therapy:

Concentrate on your eating without reading or "thinking." Simply address yourself to your food. Meals have for us become social occasions for the most part. The primitive goes off by himself to eat. Follow his example to this extent: set aside one meal a day to eat in solitude, and learn how to eat. This may take about two months, but, after that, you will have acquired a new taste, a new source of enjoyment, and you will not relapse. If you are impatient, this will seem too long. You will want magical effects, quick results without effort.

Notice your resistances to addressing the food. Do you taste the first few bites and then fall into a trance of "thinking," daydreaming, wanting to talk—meantime losing contact with the taste? Do you bite off your food by clean, efficient action of the front teeth? In other words, do you bite through on a meat sandwich held in your hands, or do you close your jaws part way and tear off a hunk? Do you ever use your molars up to the point of complete destruction of the food, that is, liquefaction? Just notice whatever it is you do, without deliberately changing anything. Many changes will occur spontaneously if you keep in contact with your food.

Do you blame the hurry and bustle of modern life for your gulping of meals? Is it different when you have leisure? Do you avoid food that is flat and tasteless, or do you just down it without demurring? Do you experience a "symphony" of flavors and textures in your food, or have you so desensitized your palate that it all tastes pretty much alike?

During each and every meal, take one bite —remember, just one, single bite!—and liquefy the food completely by chewing. Do not let one morsel escape destruction, but seek it out with your tongue and bring it into position for further chewing. When you are satisfied that the food has been fully liquefied, drink it down.

In performing this task you will "forget yourself" in the middle of the operation and swallow. You will become inattentive. You will have no time. On occasion you will feel that you have "spoiled the taste" of something good. When you encounter disgust, you will be sorry you ever started the experiment. But sooner or later a welcome byproduct of the experiment will be that you get much more taste and nourishment out of your mouthful than you would have imagined possible, and with this you will begin to have an increased feeling of yourself as an active agent.

The task is restricted to a single bite per meal, for this, no matter how simple it may sound, will be hard to do. It requires the remarshalling of an enormous amount of energy. Avoid any obsessional practice such as counting your jaw-movements (Fletcherism), for this only distracts your attention.

29. Recommended dietary allowances. National Research Council Reprint and Circular Series No. 129. Washington, D. C., Government Printing Office, 1948.

30. American Medical Association. Handbook of nutrition, ed. 2. Philadelphia, The Blakiston Co., 1951.

31. Perls, F. S.; Hefferline, R. F., and Goodman, P. Gestalt therapy: excitement and growth in the human personality. New York, Julian Messner, Inc., 1951.

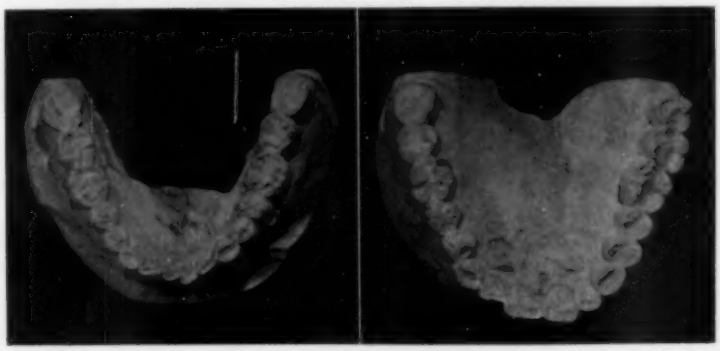

Fig. 11 • Study casts of patient showing occlusal pattern associated with vigorous mastication of abrasive foods. Note differential wear of enamel and dentin and relatively narrow (buccolingual) occlusal surfaces

These psychologists also make valuable suggestions concerning the therapy of such highly traumatic occlusal habit neuroses as tensional clamping. They state:[31]

Here is a simple technique for starting to mobilize the fixed jaw. If you notice that your teeth are frequently clenched or that you are in a state of grim determination, instead of working with ease and interest, make your lower and upper teeth touch each other lightly. Keep them neither clamped nor apart. Concentrate and await developments. Sooner or later your teeth may begin to chatter, as if with cold. Allow this to spread, if it will, into a general shivering excitement all through your muscles.

If you succeed in this experiment, use the opportunity to try to increase the looseness and amplitude of your jaw. Touch your teeth together in various positions—incisors, front molars, back molars—and meantime press your fingers against the sides of your head where the jaws meet the ears. When you find painful spots of tension, use these as foci of concentration.

Try the alternative of clamping your teeth hard in any position—the situation of biting through. This will create a painful tension in the jaws that will spread to the gums, mouth, throat and eyes. Concentrate on the pattern of tension, and then, as suddenly as you can, let go with your jaws.

To mobilize your stiff mouth, open it wide in talking and bite through your words. Spit them out like bullets from a machine-gun.

Miller[2,4] has made the very simple but highly successful suggestion of teaching such patients a new habit. They are to

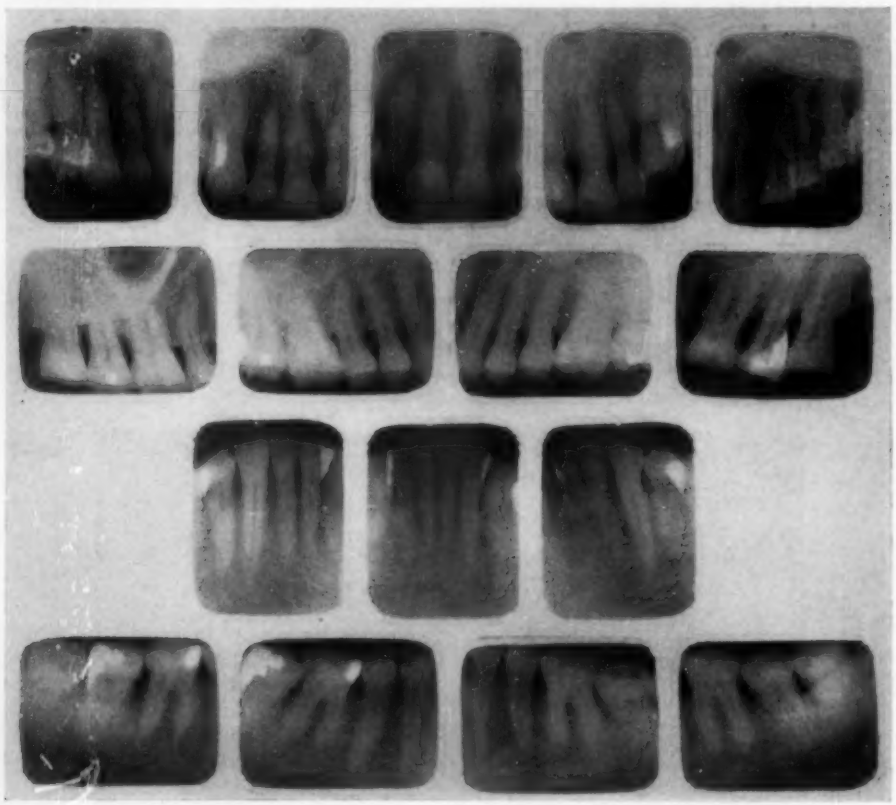

Fig. 12 • Roentgenographic series taken June 7, 1938

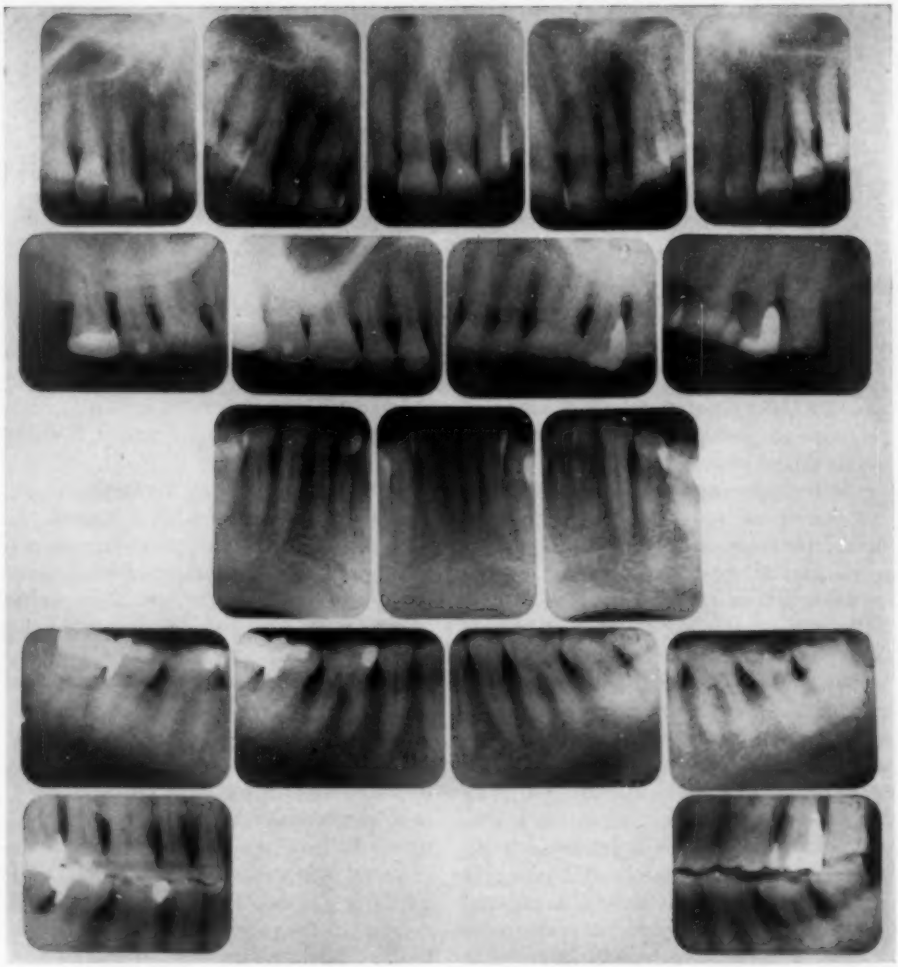

Fig. 13 • Roentgenographic series taken September 29, 1947

learn: "lips together; teeth apart." Repetition of this phrase and constant practice may help to replace the highly traumatic clenching habit.

CONCLUSION

Equilibration of occlusion may begin with office treatment involving (1) grinding; (2) orthodontic treatment; (3) surgical and exodontic procedures and (4) restoration. Equilibration may be completed, augmented and maintained by advice on food selection, occlusal habits and masticatory function. Periodic observation, supervision and guidance by the dentist are necessary to insure proper development of occlusion throughout the lifetime of his patients.

One Hanson Place

Simple method of oral color clinical photography

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Confucius is reported to have said "One picture is worth ten thousand words," and the truth of this statement can find no more positive proof than in the use of good clinical photographs.

Clinical photography has long been recognized as a valuable adjunct to a dental practice as a practice builder, as a means of patient education, as a valuable record in the treatment of oral disorders and in the presentation of case reports.

As improvements in quality and reduction in costs of photographic equipment are brought about through technical advances, the use of photography as an integral part of a dental practice and its inclusion in the curriculum of the teaching institutions will be accelerated.

It is not the purpose of this paper to present the technical aspects of clinical photography but rather to present a simple method which will give consistently and uniformly good results in the hands of those who do not possess a vast knowledge of photography.

EQUIPMENT

The 35 mm. single lens reflex camera is the ideal camera for clinical photography as it permits, by a direct view, accurate centering, viewing and focusing from 4 inches to infinity and parallax-free composition, which cannot be obtained with cameras utilizing separate viewers. It also eliminates the necessity for using a set distance focusing device. It can readily be used for family, vacation and hobby picture taking and therefore is not restricted to a specialized usage. It is compact and light in weight, and it is easily held.

In color photography the quality of the lens will control to a great extent the quality of the finished transparency. In using the single lens reflex camera, viewing of the field with the lens at its widest aperture is essential in focusing and framing. Ability to view the field in this manner until the instant of exposure is made possible by the use of the fully automatic diaphragm lens.

Variations in image magnification are obtained by means of various sized extension tubes and adapter rings. They require little cleaning, are easily interchanged and resist damage from rough handling.

The elimination of heat and glare, with resultant discomfort to the patient, of tungsten lamps and flash bulbs, as well as reduction in cost and cumbersomeness of equipment is accomplished by the use of the electronic flash element. The close-up circle speed light gives shadowless lighting and, because of the speed of the flash, stops motion on the part of the patient and the photographer, enabling the camera to be hand-held. Because of the limitations in some instances of such flat lighting, additional side lighting may be incorporated by means of extension lights whenever desired.

The equipment used by the author (Fig. 1) consists of:

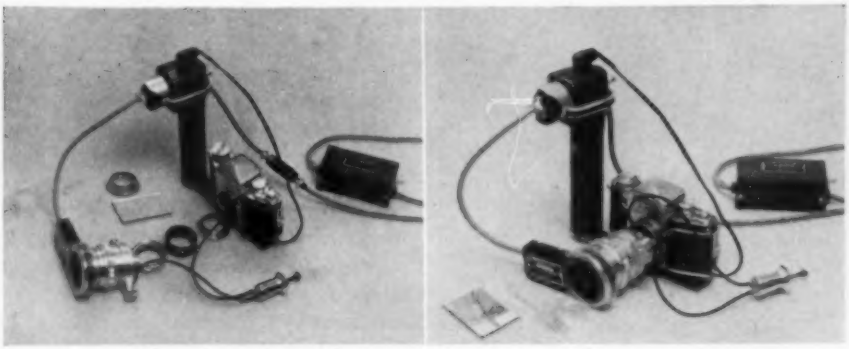

Fig. 1 • Author's camera and gear shown in exploded view at left and assembled at right

1. Exakta VX 35 mm. camera with prism eyelevel split-image view finder-range finder. Any single lens 35 mm. reflex camera, such as the Exa, Alpa, Practica, Pentacon, Praktina, and so forth, can be used. The cost ranges from $59.50 to $180 for camera body alone. Eyelevel split-image range finders cost from $29.95 to $85.
2. Fully automatic Quinon f/1.9, 55 mm. lens. The automatic lenses vary in price from $79.50 to $169.50.
3. One 15 mm. extension tube, one 10 mm. adapter ring, one 5 mm. adapter ring and one 2 in 1 adapter ring. Total cost about $20.
4. Parallel cable release. Cost $7.50.
5. Mighty-Midget close-up circle electronic speed light with power pack and A.C. power supply. (Battery power supply could just as easily be used.) Cost about $69.
6. Plane surface mirror. Cost 10 cents.
7. Clear plastic retractors. Cost $3.

EXPOSURE TECHNIC

The A.C. power supply is plugged into any standard 110 volt 60 cycle electric outlet. A standard exposure time of 1/25 of a second is used with the electronic flash which has a speed of 1/1,000 of a second and all motion is arrested. The film used is Kodachrome K135 Daylight and no correction filters are required.

The aperture setting is dependent on the subject-lens distance. The table gives the normal setting for the various distances. When using the lens only the "f" setting is computed, using a guide number of 30 by the formula:

$$f = \frac{\text{guide number}}{\text{distance}}$$

Table • Normal settings for various distances in oral clinical photography

Distance	Field size	Adapter	f/setting
3—4 in.	2 by 2¾ in.	extension tube and rings	22
8—12 in.	4¼ by 6 in.	rings only	16
16—18 in.	7½ by 10½ in.	2 in 1 adapter	11
over 18 in.	head and shoulder to full body	none	computed

Fig. 2 • Taking the picture

The subject is viewed through the prism eyelevel split-image, view finder range finder (Fig. 2) and the lens is focused by turning the distance setting ring on the front of the lens. The prism view finder gives both brilliant split-image and ground glass focusing for extreme accuracy. The smaller the aperture, the greater the depth of field, and since the focusing is done at full aperture, the depth of field actually observed is less than that obtained in the finished transparency. The depth of field is exceptionally good and is consistently adequate for excellent rendition for slide projection and printing.

The shutter is released by means of the parallel cable release which closes the lens to its pre-set aperture and releases the shutter almost simultaneously.

The camera may be used horizontally, vertically or at any convenient angle. Focusing is usually done on the principal object of interest, although excellent depth of field from anterior to posterior of the arch is obtained. In addition areas which are difficult to photograph directly may be recorded by photographing the subject as it appears in a plane mirror. The recording of specimens, casts, and so on, is obtained just as easily. The lens, extension tube and adapter rings are of the clip-on type and are interchanged easily and quickly. The time required for making an exposure is measured actually in seconds. The resulting transparencies are suitable for projection, viewing or printing, and black and white prints may be made from them if desired.

SUMMARY

The essential equipment for clinical photography has been described. A fast, practical and simple method of taking clinical photographs, requiring little more than focusing and releasing the shutter, has been developed. The simplicity of this technic makes it as near foolproof as it is possible to render photography. The dentist, by this method, is able to utilize photography as an integral part of his practice with the full acceptance of the patient and with considerable professional gratification. The resulting transparencies serve as valuable, accurate and useful records.

704 First National Bank Building

Education and Behavior • Education does not mean teaching people what they do not know. It rather means teaching them to behave as they do not behave.

Education is not teaching the youth the shapes of letters and the tricks of numbers, and then leaving them to turn their arithmetic to roguery, and their literature to lust.

Education means, on the contrary, training the youth into the perfect exercise and kingly continence of their bodies and souls. This is a painful, continual and difficult work, to be done by kindness, by watching, by warning, by precept and by praise, but above all—by example. *John Ruskin*

Occlusion in temporomandibular joint pain

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The relation of occlusion to temporomandibular joint pain as it is being dealt with in this paper implies a relation of the mechanics of tooth contact, which may be a contributing factor in producing joint symptoms. Since it is the dynamics of tooth contact, rather than a static position, it is likewise the dynamics of joint relations to tooth relations which constitute the problem. Movements of the mandible which produce tooth contacts in all the excursive positions, from the most posterior bilateral position of the two joints — when the jaws are in centric relation — to the extreme relations of cusp contact, are activated by the muscles of mastication but controlled by the temporomandibular joint. The relations of joint, teeth, and muscles might be visualized as a circle; one which could be physiologic and actually contribute to the health of all these structures. It can also be a vicious circle which, if allowed to continue unchanged, can and does lead to the breakdown of any or all these structures.

In this circle relation the teeth play a passive role. They follow the movements of the joint, in harmonious synergy, as the musculature provides the power. To understand and diagnose inharmonious relations which may be symptomatic requires an intimate understanding of the mechanics of joint relations, and an even more precise concept of tooth relations in normal function.

Although anatomically and surgically the temporomandibular joint is a complex structure, from the dynamic standpoint of joint and tooth relations it functions as though it were a moving ball and socket joint. Anatomists have debated as to whether it is technically correct to refer to it as a true ball and socket. Those who have devoted extensive study to it agree that it functions in such a manner. The Swedish anatomist, Hjortso, after a four year study, concludes, "the lower compartment of the temporomandibular joint on the working and balancing side functions as a ball and socket joint."

The salient difference between this joint and any other ball and socket joint is that while the condyle is rotating on the disk with a ball-and-socket-like action, the whole ball and socket is moving on the glenoid fossa. It is of the utmost importance to keep in mind that these actions always take place simultaneously but in a great variety of combinations; while the condyle is rotating on the disk, the disk, with the condyle held in precise relation, is also making translatory movements on the glenoid fossa.

Like all ball and socket joints, the condyle can rotate in three directions, around three main axes of rotation. These various rotatory movements can be combined with different translatory paths in a truly bewildering array of various combinations. But all these combinations are the result of two basically simple actions, rotation of the

condyle on the disk and gliding of the disk on the fossa.

The joint can adjust itself to bring about the changing tooth contacts as the mandible moves with this almost infinite variety of possible combinations of motion, but it cannot permanently adapt itself to tooth relations which are not harmonious with these two actions without injury to some part of the mechanism. That is why the teeth play a passive role. They cannot, by malarticulations, compel the joint to deviate from these normal relations without injury. Thus the circle is produced which can be beneficial or vicious, depending on these relations.

In voluntary movements of the joint, the condyle and disk are maintained in precise relation by the action of the external pterygoid muscle. Simultaneous contraction of the two heads of the pterygoid muscle moves the condyle and the disk as a unit. The nerve and blood supply is located around the periphery of the disk in regions where, in normal relation, the condyle does not make forceful contact when the mandible is being elevated by the closing muscles against resistance between the teeth. In protrusion of one joint in lateral excursion of the mandible, or both joints in lateral protrusive movement or pure protrusive movement — which rarely occurs — the condyle and disk are simultaneously moved by the external pterygoid muscle, which maintains the position of the condyle on the avascular portion of the disk. If, however, the mandible is closing in lateral excursion, on the working side the condyle is rotating on the disk without protrusion, while the other condyle is rotating and returning from protrusion on the balancing side. The closing muscles are seating the disk tightly against the fossa, through the pressure exerted against it by the condyle, as it braces itself on the disk to provide a fulcrum for the closing muscles to overcome resistance against the mandible.

ROTATION OF CONDYLE ACCOMPANIED BY DISK TRANSLATION

As pointed out previously, rotation of the condyle on the disk is always accompanied by translation of the disk. These two actions never occur independently. In the closing action just described, the condyles are making pure rotatory motions on the disks while the disks are translating on the fossae. But on the working side this translation is not protrusive; it is a path across the fossae, called the Bennett movement after its discoverer, and its path on the fossa we have referred to as the centrodynamic path.

The protrusive paths on the fossae are usually referred to as the condyle paths, but technically in the Bennett movement the centrodynamic path is simply a different direction of the condyle path. In both instances the type of action is the same; the condyle rotates while the disk translates. From the standpoint of joint problems it is convenient to consider these as separate actions even though they are similar, since they are totally different in their relation to tooth occlusions. Most joint pains of occlusal origin occur in the travel across the centrodynamic path during the Bennett movement.

When, for one reason or another, the condyle makes a forceful translatory movement on the disk instead of pure rotatory motion, symptoms of joint disturbance may ensue. This can be brought about by a variety of causes, other than tooth relations, such as muscle spasm. Other factors always enter into the total picture, but for the moment only the occlusal facet of this problem will be considered.

When the teeth are brought into forceful contact with the condyle rotating on the disk and the occlusal relation of the teeth compels the mandible to deviate in a translatory path not initiated by the external pterygoid muscle, the condyle

may move independently of the disk to impinge on a surface of the disk which is not normally a pressure-bearing area. There are many ways in which occlusion of the teeth can create such a situation. To diagnose this condition it is necessary to understand not only the minutiae of tooth relations *per se* in all contacting positions, but also the harmony of these relations to normal joint movements.

Normal tooth relations are the result of normal joint relations. Changing tooth contacts through the range of mandibular movements follow the dictates of the joint; the teeth are passive partners in a joint enterprise. It is the necessities of these harmonious relations which determine the occlusal forms required in any given mouth to maintain the integrity of this beneficial circle.

Disharmonies between the joints and occlusal forms can change this to a vicious circle. If the occlusal relation of the teeth attempts to force the mandible into a position not acceptable to the joint, conflict created by the muscles, which are attempting to maintain a harmonious relation in the joint and at the same time actuate an inharmonious occlusion, may lead to breakdown of one or the other. Usually the joint wins the battle, resulting in breakdown of the supporting structures of the teeth, be they natural or artificial. Occasionally the teeth win the battle, resulting in injury to the joint. Sometimes they both succeed in injuring each other.

It would be impossible to consider here all the details of occlusion which influence this condition. From the standpoint of the oral surgeon, whose chief interest is diagnosis of whether such a condition exists rather than the details of occlusal rehabilitation, the broad understanding is not difficult to attain.

CUSPS AND HARMONIOUS RELATIONS

Man is an omnivorous animal. He chews his meat, potatoes and vegetables at the same time. To perform this minor miracle he is endowed with the hinge action of the carnivora and the gliding action of the herbivora through the medium of his gliding ball and socket joints.

To accomplish this it is necessary to have teeth with cusps. Cusps were no accident of nature, nor do they exist just to make teeth rough and sharp like glorified rasps. They exist as nature's only means of maintaining harmony of these two simultaneous chewing actions without injury to the joints or the supporting structures. Given the choice of redesigning the joint to suit the requirements of such a diet, dentistry would still be compelled to create teeth with cusps.

The one thing which is most difficult for dentists to understand is that cusps exist as nature's only means of avoiding stress on the supporting structures while maintaining the integrity of the joints. Grinding away of inharmonious cusps and replacement with flat tooth forms has the attractive appeal of an easy way out, but it ignores the real objective of treatment: restoration of a harmonious relation of teeth to the functional relations of the joints. Flat teeth which cannot satisfy joint requirements create greater stress than properly articulated cusp teeth. Irregularities of mandibular movements activated by the muscles but controlled by the joints require cusps on the teeth in order to maintain a state of equilibrium. In normal relation cusps do not bump into each other. On the working side they pass each other, gliding over the opposing marginal ridges and sulci. On the balancing side they pass around each other in a circular path. These paths of motion do not take place in a plane. They are curved paths which require cusps to maintain equal simultaneous contact of all the teeth, with forces directed in the long axis of the supporting bone.

Because in malocclusion cusps do bump into each other, creating lateral stress, this does not condemn cusps nor

justify creating flat teeth without regard to the joint. It does highlight the necessity for creating cusp forms and relations which will maintain a harmonious relation.

Although the need for natural cusp forms to maintain equilibrium in the joint results from functional masticating movements of the joint, it is apparent to anyone who has had occasion to deal with many patients with joint pain that the original problem was not created by mastication of food. During mastication there may be little tooth contact, certainly not enough to be productive of symptoms from malocclusion. Yet the patient will complain that the symptoms are worst during mastication. Joint movements are the same whether the teeth are in contact or not. It is the stress created by nonfunctional malocclusion which produces the derangement of condyle and disk, which in turn creates the symptoms when heavy force is applied in mastication, with or without tooth contact.

A basic qualitative diagnosis of this condition is a relatively simple matter rarely requiring more than a minute or two after a little training in the procedures. Since these symptoms result from derangement of the ball and socket relations of the condyle on the disk, the method consists of obtaining pure rotational movement of the condyle unaccompanied by translatory movement of the disk, while the teeth are brought into contact. This is not a natural action for the patient to use unaided. As pointed out previously, rotary motion and translatory movement always occur simultaneously. But it is not an abnormal action, since all normal movements of the joint are a result of these two actions. In order to diagnose this condition, it is necessary to break it down into its component parts.

With the thumb placed against the chin, the mandible is guided into the most posterior position of the joint while opening and closing with pure rotary motion. By maintaining steady pressure on the chin, the patient is prevented from making translatory motions. Here a certain amount of skill and judgment is required, else it may defeat itself. The object of the thumb against the chin is not to shove the mandible back as far as the strength of the operator will permit. To do so, particularly in patients with joint difficulties where the relation of condyle to disk has been disturbed, may itself cause a translatory movement of condyle on disk and a completely erroneous diagnosis. The objective is to aid the patient to avoid translatory movement by a guiding hand, not brute force. The patient's neuromuscular pattern will instinctively attempt to guide the mandible into a position of maximum tooth contact. This must be overcome by careful guidance and, at times, can be a most troublesome factor.

PHYSIOLOGIC REST POSITION

Last but by no means least is the problem of physiologic rest position. Physiologic rest is not a functioning position. As its name implies, it is a position of rest into which the mandible drops when function has ceased. This is particularly apparent in patients in whom the relation has been disturbed. The closure from rest position to occlusal contact is always accompanied by some degree of translatory motion; it is never a pure rotary motion. It is necessary, therefore, to determine that the patient is not closing his mandible from physiologic rest position, since this is not a functional movement. The patient with a joint problem is the one who is most prone to drop his jaw into physiologic rest position as soon as function ceases. But to secure a correct functional relation of the teeth the condyle must be held up on the disk in its rotating position when force is applied. To obtain this position, as the patient is closing with rotary motion a soft rubber

block can be introduced between the upper and lower anterior teeth. The muscular force exerted to bite into it will force the condyles up into functioning position, while the thumb on the chin prevents translatory movement. If from the point of initial contact to occlusion there is translatory movement of the mandible, there is an inharmonious relation of teeth to joint.

Thus far only the mechanisms by means of which inharmonious relations of the teeth to joint produce pain symptoms have been considered. Consideration of these mechanisms may show how these symptoms occur, but it does not tell why. There are untold millions of people with similar malrelations who continue happily through life completely unaware of any disturbance. The final and, by all odds, most difficult phase of this problem still remains. In all patients with joint symptoms of dental origin psychogenic factors are being dealt with which, at times, are most difficult to handle. This does not imply that the patients can be dismissed as neurotics. There is a strong tendency today when an operator is faced with a problem he cannot understand to turn it aside with the excuse that the patient is just a neurotic. But there is always present a psychogenic factor which must be understood in its proper perspective as it affects treatment results.

ABNORMAL STRESS ON TEMPOROMANDIBULAR JOINT

The mechanical malrelation of teeth to joint provides the mechanism which enables the patient to produce the injury. I have never seen an instance of dental origin in which this relation did not exist. But the question of whether or not the patient uses this mechanism to create stress in the joint lies in the psychological makeup of the individual. On the other hand, I have treated many malocclusions in patients of similar psychological makeup who, lacking the mechanism for joint injury, are free of joint symptoms.

From the standpoint of prognosis, this is a most difficult factor to evaluate, even with the aid of a good psychoanalyst. I am not now referring to patients who are frank psychiatric problems. I have in mind the so called mentally normal individual who, in the stresses of modern living, gives vent to the "slings and arrows of outrageous fortune" by placing abnormal stresses on the temporomandibular joint through the medium of his teeth.

Since the beginning of time the mouth has been closely linked to the emotional state, even in the animal world. Tacit recognition of this has been given for many years by such expressions as "grit his teeth in anger," "snarled at his adversary," "setting his teeth on edge," and similar idioms. Tensions of modern life are reflected in the mouth. Relieving the mechanical relations which made the injury possible does not change the psychogenic problems. If the injury is severe and long standing, recovery may be a slow and tedious process unless accompanied by psychological aid. On the other hand, once an injury has occurred, relief by psychological means alone is rarely adequate.

There is another group of patients in the same category in whom the malocclusion itself has created the psychological problem responsible for the stress in the joint. Unfortunately, most of these are created by bad dentistry. Sometimes even oral surgeons are responsible, because they extract a tooth which had been in premature contact with a developed neuromuscular pattern. Removal of the tooth in premature contact creates the immediate need for a new neuromuscular pattern without adequate time to develop it, and the resulting chaos creates a joint problem. The identical situation occurs all too frequently when there is haphazard extensive tooth grinding, and inadequate rehabilitation.

SUMMARY

The temporomandibular joint, within the range of tooth contact, functions as a moving ball and socket joint. The upper teeth being fixed in the maxilla and the lower teeth in the mandible, since the mandible is related to the maxilla by the joint, the relation of the teeth to each other must be determined by their relation to the joint. Occlusal disharmonies which, by their relation to the joint cause a derangement of the condyle to disk relation, may produce characteristic joint symptoms. Factors other than the occlusal relation may produce similar manifestations, but in those instances which are of dental origin this disturbed relation is always present. In these patients the psychogenic factor is ever present and sometimes can be a serious problem in treatment. Many times correction of the occlusal problem is adequate to bring the symptoms under control but is difficult to evaluate in prognosis.

Clinical qualitative diagnosis is relatively simple, but exact diagnosis and treatment requires a precise mounting on a suitable instrument capable of accurate reproduction of joint to tooth relations. Tooth grinding and removable splints will sometimes bring temporary relief, but offer no permanent solution to dentistry as a treatment for a sick mouth.

Effectiveness of water coolants with rotary cutting instruments

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Recent refinements and developments in dental handpieces, motor units, burs and diamond instruments make it possible to operate rotating instruments at speeds well beyond the range anticipated a few years ago. Accompanying this change to faster operating speeds has been a change in ideas regarding the choice of cutting instrument, the technic of instrumentation, the means of accomplishing increased operating speeds and the manner of applying the necessary coolant to the region being cut. Fortunately, no change in idea exists regarding the need to preserve the remaining tooth structure in the most favorable physiologic condition, with a minimum of trauma developed during the cutting operation.

Numerous studies indicate that excessive temperatures may be developed if no precautions are taken to apply a coolant during the cutting operation.[1-9] Various devices have been suggested as a con-

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venient means to apply air, water-air mixtures, water streams, carbon dioxide gas or other coolants to the surface being cut or to the cutting instrument during the shaping of the cavity.[10-17] Several devices for this purpose are commercially available. The possible damage to the pulp and remaining tooth structure also has been described.[17-21] It has been recognized for several years by the dental profession that the application of a suitable coolant represents acceptable practice, and with the introduction of increased operating speeds the use of coolants is regarded as being even more essential.

Prevailing practices make use of either an atomized water-air spray mixture or a water stream directed on the cutting surface where a coolant is employed. Water or water-air mixtures have numerous practical advantages over other types of coolants; they are convenient, inexpensive to apply, and generally effective. Air alone has been shown to be much less effective than either water or water-air mixtures, and other cooling systems may require special facilities and equipment to apply effectively the coolant or chill the instrument. The purpose of this study was to evaluate the effectiveness of water applied as a water-air spray mixture and as a stream to small burs and diamond instruments operated at speeds of 30,000 to 170,000 rpm, with a force on the instrument of 2 to 8 ounces. The effects of changing the volume and temperature of water applied were studied in relation to the temperature rise developed during the cutting operation. It was not the purpose of this study to compare equipment or devices that are available to apply the coolant to the tooth surface.

EQUIPMENT AND METHOD OF TEST

Previous reports describe a method used to record the temperature rise developed in the tooth during the cutting operation.[4, 5, 7] The same method was used in this study, and consisted primarily of wedging a thermocouple into a freshly extracted tooth, so that the thermocouple tip was located at approximately the dentinoenamel junction. The temperature changes were recorded on an autographic temperature recorder. Intermittent cutting was employed with all instruments, with a 2 second cut followed by a 1 second rest, until the instant when the thermocouple tip was exposed. Five individual values were averaged to give the value reported for each test condition described.

Regular commercial steel and carbide burs and diamond instruments, obtained through local retail outlets, were used. A number of different handpieces and contra-angles of either the ball-bearing or sleeve-bearing type were used for studies at speeds of 30,000 rpm. For speeds of 50,000 rpm and 170,000 rpm, the Page-

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Chayes angle handpiece was employed. To control the force applied during the cutting operation, the tooth being cut was mounted on a platform which was counterweighted through a lever system to the desired amount for each test condition. The coolant was applied to both the tooth and cutting instrument by means of commercially available spray and stream attachments, and by laboratory designed syphon and atomized spray systems, through nozzles either permanently attached to the handpiece, clipped into position, or manually directed from the outlet of a small tube. Although some methods were more convenient than others, no difference in results obtained was evident which could be attributed to the means of applying the coolant.

OBSERVATIONS AND RESULTS

Previous studies have described results obtained when various diamonds and burs were tested with one-half pound and one pound loads applied to the instrument when it was operated at speeds up to 30,000 rpm.[7] In those studies water-air spray, air, and no coolant were tested. Earlier studies were made at slower operating speeds and heavier applied loads.[5] It has been observed both in clinical studies and in research investigations that with increased operating speeds, less applied force is necessary to cut the tooth tissue effectively. For that reason, the force applied during these tests has ranged from one-half pound (eight ounces) downward to a minimum of two ounces. Four ounces seems to be an effective applied force when operating at 30,000 rpm or above.

In Figure 1 is shown the temperature rise observed when no. 37 steel burs were operated at 10,000, 20,000 and 30,000 rpm and a one-half pound load applied on the bur, with a water stream, water-air spray, air, or no coolant applied. This shows graphically that both the water stream and water-air spray were effective in keeping the temperature rise within a presumably safe range of less than 10 to 12°F. when speeds of 30,000 rpm were employed. At lower speeds the temperature rise was less. When the water stream was used, the water temperature was at approximately 100°F., and 60 cc. per minute (1 cc. per second) were delivered as a fine stream to the tooth surface being cut. In practice, it is necessary to employ an effective system to remove the water from the mouth, thus sometimes creating the need for auxiliary equipment. It may be debated if the additional effectiveness of the water stream justifies the use of extra personnel or equipment to remove the water from the mouth. At the present time, it is not known if the water stream is significantly more advantageous than the water spray.

In Figure 2 are shown the results obtained when no. 37 carbide burs were used in the same manner as described for the steel burs in Figure 1. The results obtained when using carbide burs were comparable to those obtained with similar type steel burs. At increased operating speeds, the carbide burs, because of their increased life and effectiveness, are preferred over the steel burs, so that the extensive investigation of steel burs was not continued in this study.

The values plotted in Figure 3 show the temperature rise observed when a no. 39 diamond instrument was used in the same manner as the steel and carbide burs. The results in this instance were similar to those obtained when burs were used. With each instrument it is apparent that to operate with no coolant, or with air alone, should not be recommended when speeds of 10,000 rpm or more are employed. It seems reasonable to assume that a temperature rise in a region adjacent to the pulp, comparable to that recorded when no coolant, or air, is employed, may cause serious discomfort and perhaps permanent damage to the pulp. More histologic information on this problem is desirable.

Effect of Pressure at 30,000 rpm • In an effort to relate the temperature rise to the force applied during the cutting operation, a series of tests was made at 30,000 rpm with forces of from two to eight ounces on the cutting instrument. The operating speeds were measured both before and after the cut was made to determine that no change in speed had occurred during the operation. For different tests the speed varied from 30,000 to 32,000 rpm. As shown in Table 1, a series of carbide burs was used with a water-air spray which delivered a water concentration of 8.5 cc. per minute. As has been observed in other studies, the larger bur of each type developed slightly greater temperature rises than the smaller bur. In no test was the temperature rise excessive, although it showed a gradual increase with the increase in force from two ounces to eight ounces. It seems doubtful that a force of eight ounces or more would be applied to the instrument when operating at 30,000 rpm or above.

A question is often raised regarding

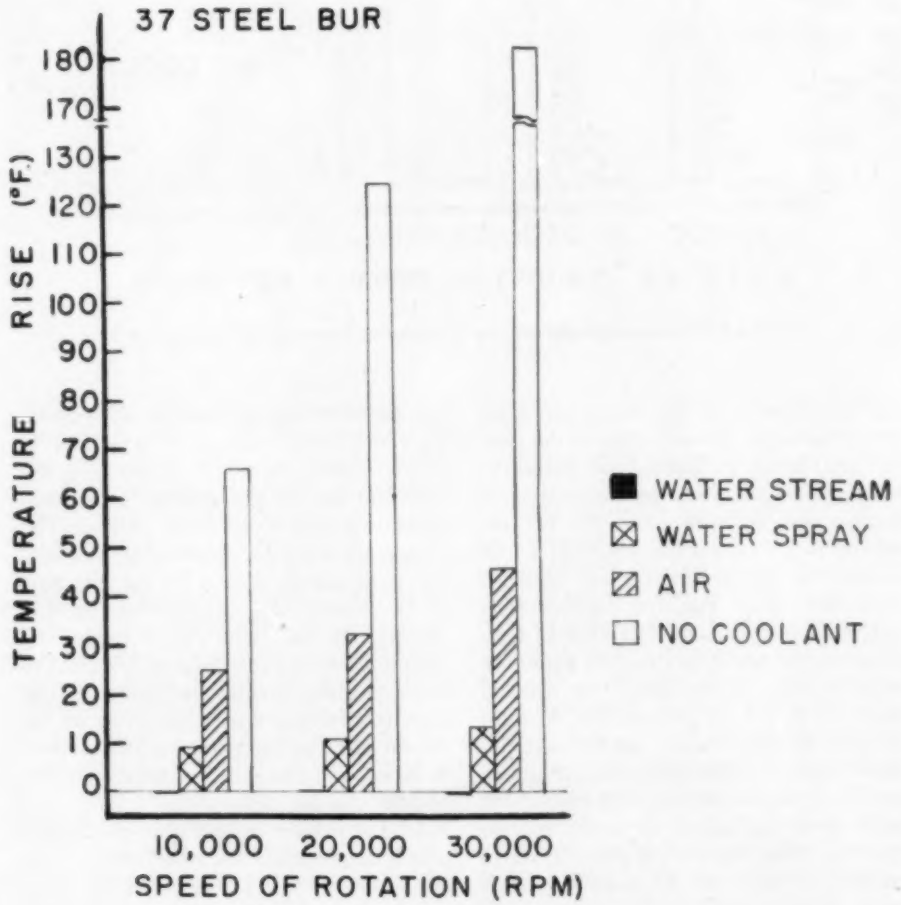

Fig. 1 • Temperature rise with no. 37 steel bur and various coolants

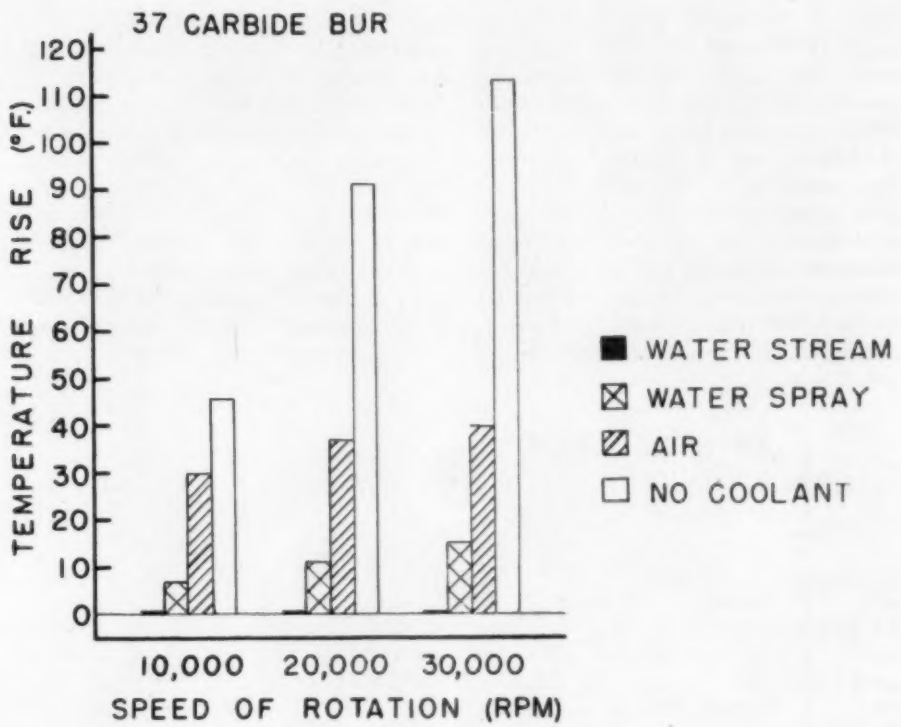

Fig. 2 • Temperature rise with no. 37 carbide bur and various coolants

the effectiveness of the water-air spray when the water concentration in the mixture is reduced. In Table 2 are shown the results obtained when the water concentration was reduced from 8.5 cc. per minute to 1.5 cc. per minute, with a four ounce load applied to the bur operated at 30,000 rpm. For the carbide burs tested, little significant difference in temperature rise could be detected when the water content of the spray was reduced from 8.5 to 4.0 cc. per minute. A slight increase in temperature rise became evident when the water content was reduced to 1.5 cc. per minute, which is considered to be about the minimum water volume that would be practical. A reduced water content is preferred by some operators as an aid to vision.

A series of small diamond instruments was tested in the same way as the carbide burs described earlier. The values in Table 3 show the effect of changing the load applied to the cutting instrument from two ounces to eight ounces. The temperature rise for diamond instruments was comparable to that for carbide burs at the lower force applications during cutting. At the eight ounce range, the diamond instruments showed from one to three degrees greater temperature rise than the carbide burs studied. In no instance did the temperature rise appear to be excessive as it did in tests where no coolant was applied.

In Table 4 are temperature rise values which demonstrate the effect of reducing the water content in the water-air spray system from 8.5 to 1.5 cc. per minute, with diamond instruments operated at

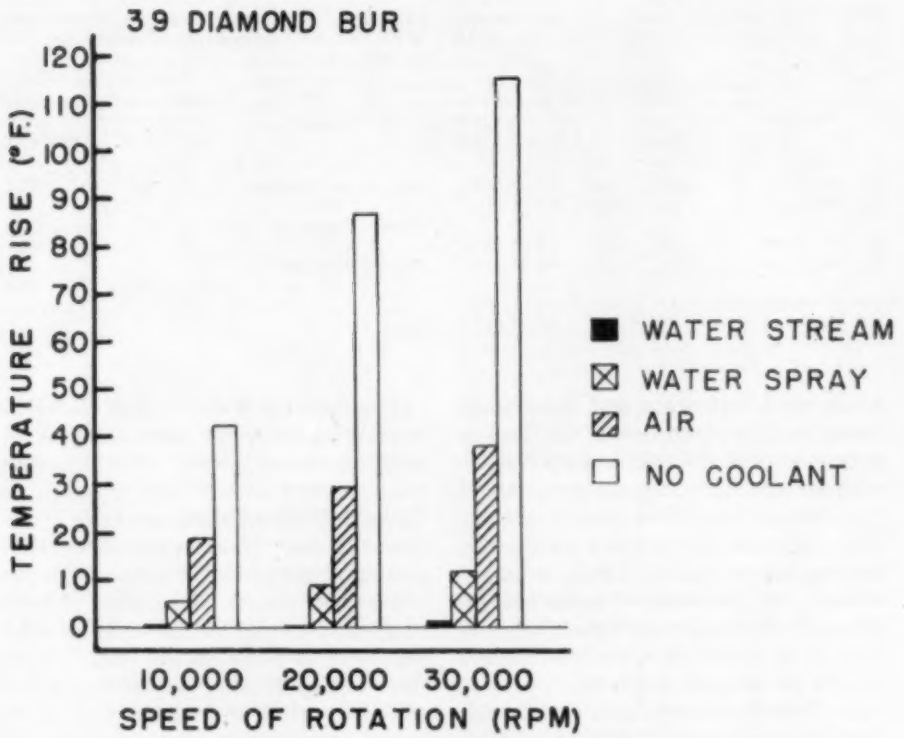

Fig. 3 • Temperature rise with no. 39 diamond instrument and various coolants

30,000 rpm and a four ounce load on the instrument. Under these conditions it may be seen that the temperature rise, although approximately doubled, was still not excessive when the water concentration was reduced to a minimum.

Effect of Pressure at 170,000 rpm • In order to determine the effectiveness of the water-air spray system at relatively high operating speeds, the temperature rise developed by a series of small instruments listed in Table 5 was recorded when 8.5 cc. per minute of water, and a force of from two to six ounces was applied to the instrument. When operating the Page-Chayes angle handpiece, it appeared that six ounces was the maximum desirable force that should be applied for the instrument to perform at maximum effectiveness. In practice it would seem that a force of from two to four ounces would be most favorable when a speed of from 150,000 to 200,000 rpm is used. Perhaps it should be recalled at this point for comparison that less than ten years ago a speed of 2,500 rpm and an applied force of two pounds (32 ounces) or more were considered to be common practice.[4]

From Table 5 it may be seen that the water-air spray was effective in keeping the temperature rise to a minimum when carbide burs, carborundum stones and small diamond instruments were operated at 170,000 rpm and a four ounce force application. A slight increase in applied force may produce a significant increase in temperature rise. As is generally true, large instruments develop a greater temperature rise than small instruments.

Table 1 • Temperature change at approximately 30,000 rpm with water-air spray (output ave. = 8.5 cc./min.)

Instrument	Temperature (°F.) at pressures			
	2 oz.	4 oz.	6 oz.	8 oz.
No. 37 carbide bur	4.8	5.8	8.2	9.5
No. 39 carbide bur	6.3	8.3	10.3	13.1
No. 557 carbide bur	4.7	5.2	7.2	8.6
No. 559 carbide bur	4.0	6.2	9.0	10.1
No. 701 carbide bur	3.7	4.9	6.7	8.3
No. 702 carbide bur	3.7	5.5	8.0	10.2

Table 3 • Temperature change at approximately 30,000 rpm with water-air spray (output ave. = 8.5 cc./min.)

Instrument	Temperature (°F.) at pressures			
	2 oz.	4 oz.	6 oz.	8 oz.
Inverted cone diamond (1K)	4.8	6.3	9.0	13.8
Cylindrical diamond (4F)	5.8	6.7	10.7	13.2
Tapered diamond (2D)	5.2	8.0	11.0	14.0

When used with care and good judgment, however, instruments operated at speeds of from 150,000 to 200,000 rpm with the attached water-air spray on the Page-Chayes handpiece should not develop excessive temperature rises during the cutting operation. From a limited series of tests, however, it seems inadvisable to reduce appreciably the water content of the water-air spray when speeds of 170,000 rpm are employed.

In Table 6 it may be seen that carbide burs operated at speeds of 30,000, 50,000 and 170,000 rpm did not develop an excessive temperature rise when a room temperature water-air spray, and a four ounce cutting load were applied. The average temperature rise varied slightly from one bur to another, and increased slightly with an increase in speed, but remained less than 12°F. for the three burs tested.

The values in Table 7 show the effect of using mouth temperature water for the water-air spray system, with the same three types of carbide burs described in Table 6. With all other operating conditions the same, there appeared to be no significant difference in temperature rise when either mouth temperature or room temperature water for the water-air spray was used at 30,000 or at 170,000 rpm. The results in all previous tables and charts reported were obtained from the use of room temperature water for the water-air spray, with the water temperature ranging from 72°F. to 78°F.

In order to compare the effectiveness of a high-volume, low-pressure, water stream with the water-air spray system, a series of tests for temperature rise was made at 30,000 and 170,000 rpm with three types of carbide burs. As seen in Table 8, two quantities of water were

Table 2 • Temperature rise at approximately 30,000 rpm with reduced water-air spray output (4 oz. pressure)

Instrument	Temperature (°F.) with various water-air spray mixtures		
	8.5 cc./min.	4.0 cc./min.	1.5 cc./min.
No. 37 carbide bur	5.8	5.8	9.8
No. 39 carbide bur	8.3	8.3	10.0
No. 557 carbide bur	5.2	7.8	10.5
No. 559 carbide bur	6.2	8.7	11.4
No. 701 carbide bur	4.9	7.8	9.3
No. 702 carbide bur	5.5	6.4	11.4

Table 4 • Temperature rise at approximately 30,000 rpm with reduced water-air spray output (4 oz. pressure)

Instrument	Temperature (°F.) with various water-air spray mixtures	
	8.5 cc./min.	1.5 cc./min.
Inverted cone diamond (1K)	6.3	12.5
Cylindrica l diamond (4F)	6.7	14.3
Tapered diamond (2D)	8.0	13.7

applied to the surface being cut. The quantity of 125 cc. per minute represents approximately twice the amount used in the tests described in Figures 1 to 3 in which a 60 cc. per minute mouth temperature stream of water was used, and the 350 cc. per minute is approximately six times that amount. In comparison with the maximum water delivered by some water-air spray systems, 125 cc. per minute represents 15 times more water, and 350 cc. per minute is about 40 times the amount of water in the region as with the spray. From Table 8 it may be seen that a slight temperature increase was observed when using these volumes of water, but probably it is of little significance from the standpoint of patient discomfort or tissue damage. The difference in average temperature rise at 30,000 and 170,000 rpm was slight, and no significance should be attached to the fact that in some instances the temperature rise was slightly less at the higher speed. The problem involved in removing these volumes of water from the operating region is of much more practical concern than is the slight variation in temperature rise experienced.

To determine the influence of varying the volume of mouth temperature water in the operating region, a series of temperature rise measurements was made with a no. 37 steel bur and no. 39 diamond instrument when rotated at 20,000 rpm and a one-half pound load applied. In this series of tests the volume of water was varied from 13 cc. per min-

Table 5 • Temperature rise produced by instrument operated at various pressures and 170,000 rpm with water-air spray (8.5 cc./min.)

Instrument	Temperature (°F.) at different pressures		
	2 oz.	4 oz.	6 oz.
No. 37 carbide bur	8.2	8.6	10.2
No. 557 carbide bur	8.8	9.2	11.8
No. 701 carbide bur	11.4	11.6	12.8
No. 702 carbide bur	13.8	18.7	28.1
Knife edge stone (5.0 mm. diam.)	8.2	10.6	10.8
Inverted cone diamond (no. 39) (2.0 mm. diam.)	9.0	9.8	14.8
Diamond wheel (5.0 mm. x 1.0 mm.)	10.4	11.2	16.0

Table 6 • Temperature rise at three speeds with room temperature water-air spray applied (8.5 cc./min.—4 oz. pressure)

Instrument	Temperature change (°F.)		
	30,000 rpm	50,000 rpm	170,000 rpm
No. 37 carbide bur	5.8	6.0	8.6
No. 557 carbide bur	5.2	7.7	9.2
No. 701 carbide bur	4.9	5.2	11.6

Table 7 • Temperature rise with mouth temperature water as source for water-air spray (8.5 cc./min.—4 oz. pressure)

Instrument	Temperature (°F.) at two speeds	
	30,000 rpm	170,000 rpm
No. 37 carbide bur	6.2	12.4
No. 557 carbide bur	4.4	11.4
No. 701 carbide bur	4.6	8.0

ute (minimum) to 60 cc. per minute (average), and finally to 100 cc. per minute which was considered to be an excessive volume. The results are shown in Figure 4. In order to remove the water from the operating area, a Vacudent unit was used in one series of tests (W.V.) and omitted in another (W.O.V.). It may be seen from Figure 4 that when 60 cc. of water was used per minute, the cooling action was effective. When a reduced volume of water flowed over the region, some temperature rise was experienced. A slightly greater temperature rise was experienced when the Vacudent unit served to remove the small volume of water from the region than when not, perhaps because of the removal of the water before it could exhibit a cooling action. Effective cooling and water removal were experienced when the larger quantity of water was applied to the field of operation.

A limited series of temperature rise measurements were made at 20,000 and 30,000 rpm with a perforated and nonperforated diamond disk of approximately ¾ inch diameter, when using 60 cc. of mouth temperature water per minute. The results in Figure 5 indicate that at these speeds the perforated disk showed less temperature rise than the nonperforated disk when operated with a one-half pound load. Although large diameter disks are less essential in the shaping of cavities at increased operating speeds than at lower speeds, it is well to exercise caution in the use of the nonperforated disk at speeds of more than 10,000 rpm. More studies are needed to determine the effective load to be applied during cutting with disks, and how the nonperforated disks may be cooled most effectively.

Relative Temperatures of Water and Water-Air Spray • Some temperature measurements were made to determine if

Table 8 • Temperature rise resulting from room temperature water stream of high volume delivered at low pressure (4 oz. pressure on bur)

Instrument	Temperature change (°F.)			
	30,000 rpm		170,000 rpm	
	125 cc./min.	350 cc./min.	125 cc./min.	350 cc./min.
No. 37 carbide bur	2.4	1.2	3.5	1.1
No. 557 carbide bur	4.2	2.0	3.8	0.8
No. 701 carbide bur	4.8	1.2	3.8	1.1

the spray issuing from a water-air spray system was cooler than the water in the container. In Table 9 is an average of six values for water both at room temperature and mouth temperature. It is seen that when room temperature water at 76.1°F. was formed into a spray, the temperature of the spray dropped to an average of 69.2°F., which is 6.9°F. below the temperature of the water supply. The water in the mouth temperature tests varied slightly from one trial to another, but the average temperature in the bottle was 98.3°F. When this water was mixed with room temperature air to form a water-air spray, the temperature of the spray dropped to an average value of 79.3°F. which approaches closely the average air temperature and is 19°F. below that of the mouth temperature water. Further measurements of this type should reveal other interesting correlations.

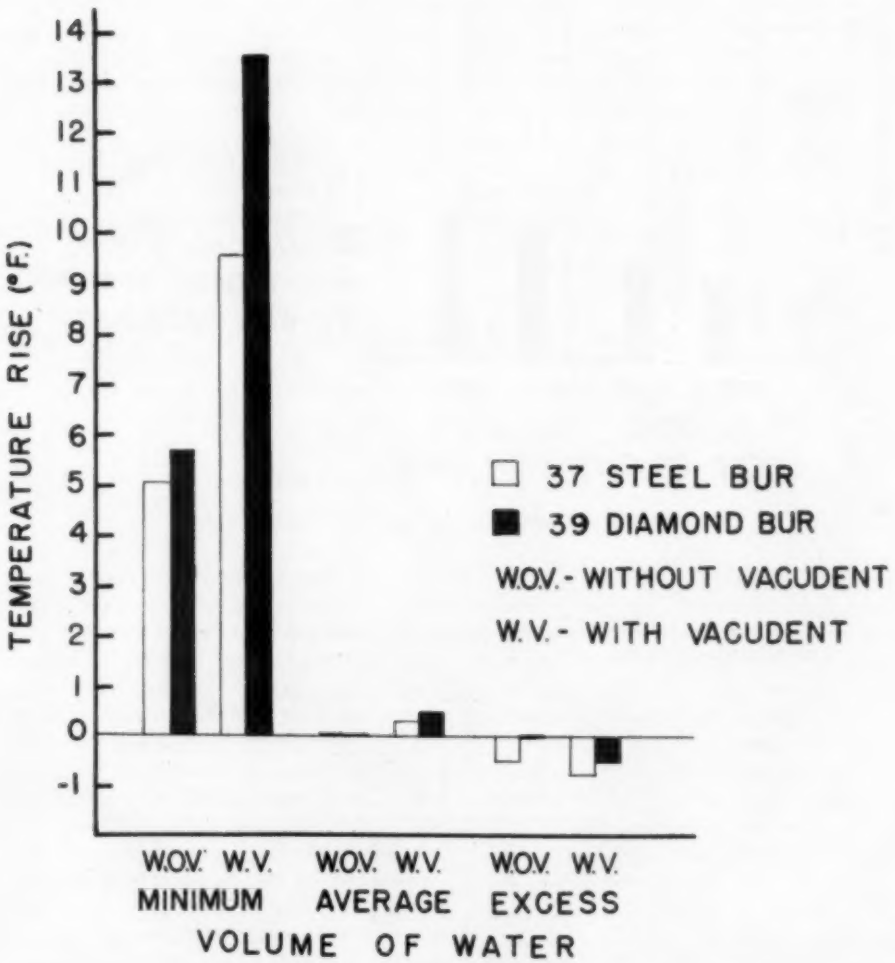

Fig. 4 • Cooling effect of various volumes of water on steel bur and diamond instrument during cutting

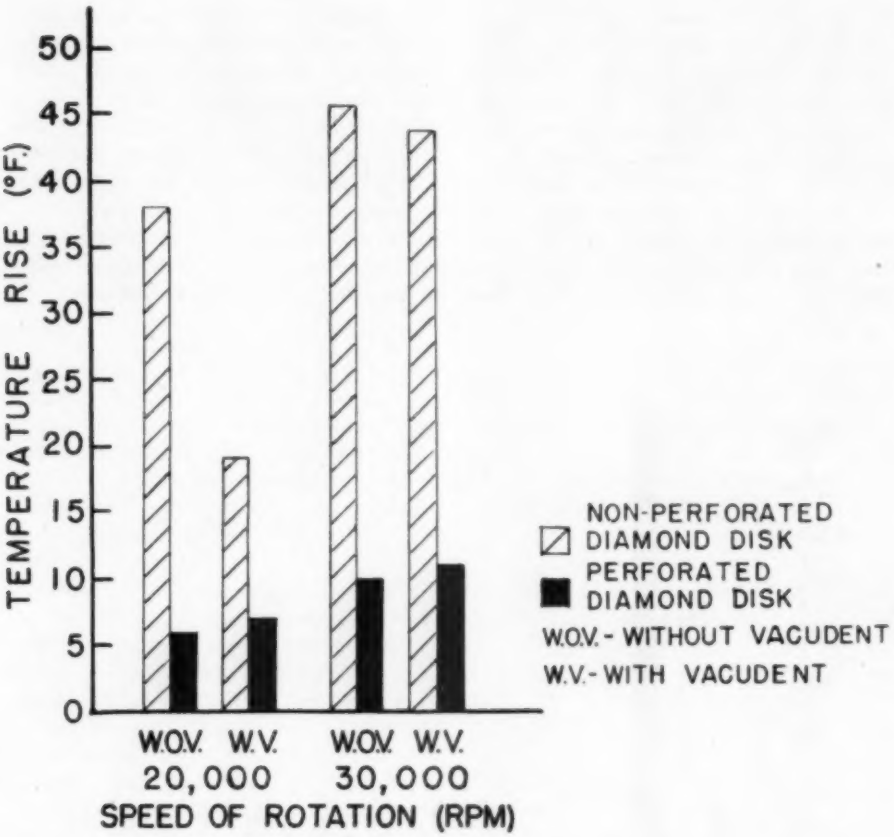

Fig. 5 • Effect of water stream as coolant on diamond disks

Table 9 • Comparison of water temperature in spray bottle with temperature of water-air spray (8.5 cc./min.)

Trial	Temperature (°F.) of water and water-air spray				Room temp.
	Room temperature		Mouth temperature		
	In bottle	Water-air spray	In bottle	Water-air spray	
1	76.1	70.7	98.4	80.0	78.5
2	76.1	68.9	98.6	79.1	78.5
3	76.1	68.8	98.6	79.8	79.7
4	76.1	70.3	98.4	79.5	80.6
5	76.1	68.9	97.8	79.0	79.0
6	76.1	68.5	98.0	78.6	79.0
Average	76.1	69.2	98.3	79.3	79.2

SUMMARY

Studies were made to evaluate the effectiveness of the water-air spray and the water stream as coolants for rotating dental instruments. Some correlations were made with previous studies in which a greater force was applied to the cutting instrument during the operation and in which either an air stream or no coolant was used. It was observed that small diamond instruments and carbide burs were effective when operated at 30,000 to 170,000 rpm with only a four ounce force applied during the cutting operation. When these same small instruments were used, it was determined that either the water-air spray or the water stream served as an effective coolant.

Little significant difference was experienced when using room temperature water or mouth temperature water. Although it was observed that a generous volume of water applied to the tooth during the cutting operation reduced the temperature rise by as much as 10 or 12°F. below that resulting from the water-air spray coolant, the importance of this reduction is not presently known. At this time it appears that, if properly handled, both the water-air spray and the water stream serve as effective coolants with the conventional small instruments currently available, when operated at prevailing maximum speeds of rotation. The choice might be more likely determined on the basis of individual choice, convenience, better vision or other such quality, than because of adequate cooling by either method.

Pin reinforcement and retention of amalgam foundations and restorations

Miles R. Markley, D.D.S., Denver

Teeth with mutilated crowns, but with solid roots, can be dependably salvaged for many years of useful service by a method analogous to reinforced concrete architecture. Silver amalgam, reinforced with threaded, stainless steel pins, is as different from ordinary amalgam as the concrete in a sidewalk is different from the reinforced columns of a modern skyscraper, and by the same principle. These reinforcement pins, extended and cemented into holes drilled in the remaining tooth or root structure, provide retention par excellence, and require the removal of only minute amounts of tooth structure.[1]

Present dental restorations have no adhesive power. Therefore, restorations traditionally must be built either into cavities providing ample retentive locks, or around relatively strong stumps in the manner of full or partial veneer crowns. The "hollow tooth" presents the problem of having only frail enamel walls to retain a filling. If the hollow tooth is filled with a foundation material and is then shaped to provide draft for complete

Read before the Chicago Mid-Winter Meeting, Chicago Dental Society, February 4, 1957.

1. Markley, Miles R. Restorations of silver amalgam. J.A.D.A. 43:133 Aug. 1951.

or three quarter coverage, little tooth structure is left to support the combined foundation and veneer crown. The entire crown frequently cracks off after restoration in such a manner. Fractured teeth, and teeth with crowns weakened by endodontic treatment, also create problems for restoration.

FOUNDATIONS

Cement bases are grossly overdone in dental practice. Dental cements lack sufficient crushing and shear strength to serve as durable foundations under restorations. Failure to recognize this weakness is a common error among practicing dentists and in schools which teach students to remove the caries, fill the cavity with cement, then cut an ideal cavity in the cement. The resulting restoration is seated largely on cement having a crushing strength of only one fourth to one fifteenth that of amalgam and of dentin.[2]

Many restored teeth fracture because cement bases allow movement of the restoration under stress. Stresses build up which tend to split the tooth holding the restoration. This is particularly true of inlays, built necessarily in the shape of a wedge to provide draft. Even if actual fracture does not occur, movement of restorations supported by compressible cement causes margins to open, allowing leakage and recurrent caries. Well condensed amalgam as a foundation, however, has a compressive strength comparable to that of dentin and provides an ideal stress-resistant base. A zinc oxide-eugenol cement base has even less crushing strength than dental cement and so should never be used over more than a tiny region under a restoration. If a zinc oxide-eugenol dressing is needed to quiet an inflamed pulp, it should be applied for a period of a few days to two weeks, then completely removed before restoration.

G. V. Black taught that restorations should be seated on sound dentin, prepared at right angles to functional stress.[3] Obviously slight undercuts should be blocked out for cast restorations, and small areas close to the pulp may require insulation, but the load of any restoration should be carried on tooth structure, not on cement, always using the minimum possible amount of cement.

Not only are cement foundations too weak to bear functional stress but they are soluble. If they extend anywhere near the margins of cast restorations, or become exposed by subsequent occlusal wear, they are dissolved readily by percolating mouth fluids, creating a hazardous recurrent caries problem. Nelsen, Wolcott and Paffenbarger[4] have demonstrated that there is percolation from all restorations when cold and hot foods are taken into the mouth. The higher the coefficient of expansion of the restoration, the more percolation occurs. This explains the high incidence of recurrent caries under cast, cement restorations with their permeable dental cement seals.

Since amalgam is not soluble, amalgam foundations are safer against recurrent caries than cement bases. Furthermore, amalgam corrodes where leakage or percolation does occur. That corrosion products apparently seal the leak is a logical explanation for the well known resistance of amalgam restorations to recurrent caries. If the cavity is close enough to the pulp for the conductive amalgam base to cause thermal shock, an insulating spot of cement should be placed over the deep region. The cemented portion should be kept small so that the foundation and restoration are seated principally on tooth structure. Wherever oxyphosphate of zinc cement is used in a region close to the pulp, the pulp first should be protected against cement shock

2. Skinner, E. W. Science of dental materials, ed. 3, revised. Philadelphia, W. B. Saunders Co., 1946, p. 145.

3. Black, G. V. Operative dentistry, vol. 2, ed. 4. Chicago, Medico-Dental Publishing Co., 1920, p. 132.

4. Nelsen, R. J.; Wolcott, Robert B., and Paffenbarger, George C. Fluid exchange at margins of dental restorations. J.A.D.A. 44:288 March 1952.

with a calcium hydroxide-bearing varnish. Cement shock and the overheating of teeth during cavity preparation are the principal causes of sensitive restored teeth.

Strength against crushing force, insolubility, caries resistance, and its kindness to pulp tissue, all tend to make amalgam the ideal foundation material. But amalgam has one unfortunate weakness; it is brittle. In a weak tooth it lacks shear strength to support lateral strains. Fortunately, reinforcement and retention of amalgam with threaded, wrought metal pins change such potential failure into dependable success and so pins become a valuable supplement to the traditional forms of retention.

It is essential that a rubber dam technic be used routinely for any amalgam restoration or foundation. For broken-down teeth, the technic for rubber dam application, and the selection, placement and stabilization of rubber dam clamps, will be comparable to that used in Class V restorations.[5] Heavy rubber dam, preferably 0.012 inch thick, will seal against moisture where a thinner dam will not. This is so important that rubber dam purchases should be checked with a micrometer.

TECHNIC OF PLACING PINS

With roentgenograms and a knowledge of dental anatomy it is possible to dodge the pulp and to miss root bifurcations while drilling holes to receive from 1 to 8 threaded pins in each tooth. These holes should extend from 2 to 5 mm. into sound dentin. Pins need not be parallel to support amalgam; they are even more retentive if they are not parallel. Pins should be extended occlusally almost through the restoration or foundation to give it maximum strength.

Threaded stainless steel wire of 0.025 inch diameter can be procured in one foot lengths from dental supply sources[6] at about one fifth the cost of the threaded iridioplatinum wire formerly used for amalgam and still in use for pin retention in gold castings. Stainless steel is harder and stronger than iridioplatinum and so provides better as well as less expensive reinforcement. Dental handpiece 0.027 inch diameter twist drills (0.7 mm. "Spirec Bohrers") for drilling the pin holes, and "Lentulo-spirals" for carrying oxyphosphate of zinc cement into the holes, simplify the technic. It is important that a coolant be used in the drilling procedure. Avoiding the use of dull drills will also help eliminate excessive heat. The dentist can resharpen the twist drills when they become dull. These items are being imported from Swiss manufacturers for domestic distribution by the Star Dental Manufacturing Co., Inc. of Philadelphia. The spirals are intended to carry cements and medicaments into root canals. For filling pin holes of this size they serve better if 4 mm. of the sharp point is snipped off.

The ends of the threaded wire are rounded with an abrasive disk to facilitate entry to the full depth of the pin holes, then are clipped to length with a machinist's wire cutter. (Crown and bridge scissors will be ruined if used to cut steel wire.) A pin of the proper length is inserted into each hole, with removing and bending of the pins done with two pairs of pliers if necessary to keep the free ends within the contour of the restoration. Pins will not fall out of the holes in the upper teeth if the patient is positioned with his head back.

A retarded mix of crown and bridge cement is prepared on a cold slab. In turn, each pin is removed with grooved beak pliers and is handed to the assistant. (The dentist can make grooves quickly and easily in a pair of cotton pliers, cutting opposing grooves on the inside surfaces of each beak, parallel to the points,

5. Markley, Miles R. Amalgam restorations for Class V cavities. J.A.D.A. 50:301 March 1955.

6. K & R Dental Products Co., Box 292, Blue Island, Chicago.

using a ½ inch diameter Jo Dandy disk in a handpiece. Pins cannot be handled satisfactorily in any other way. Grooved beak pliers may be purchased from Calkins Dental Supply Co. of Ann Arbor.)

While the assistant butters the point of the pin with cement and draws it through her fingers to remove the excess, the operator picks up a droplet of cement on the spiral in the handpiece and spins it into the pin hole. The pin, still held in the pliers, is returned to the operator for insertion to the depth of the hole for which it has been previously fitted. By this teamwork as many as eight pins can be placed with one mix of cement. Ideally, the only excess to be removed will be a small bead of cement displaced by the pin. This can be flipped off with an explorer point as it begins to set.

RESTORATIONS OF REINFORCED AMALGAM

While the cement is setting around the pins, a copper band matrix is fitted to the tooth. For a reinforced amalgam restoration, it is important to have an anatomically correct, perfectly stable matrix. A seamless copper band is annealed by heating red-hot and immersing in alcohol or water. It is then contoured with curved, contouring pliers (and a Densco band stretcher if one is available) to restore tooth form and festooned to the gum attachment with curved scissors. (Quinby Gum Scissors, Pfingst no. 8, are ideal for festooning the smaller sizes of copper bands without distorting them.)

Contacting areas of the band are reduced to paper thinness with a coarse sandpaper disk and are then recontoured. The band is then tightened at the cervical by pinching up a tuck at the gingival edge in an area accessible to flat nosed pliers. The contour of the band is perfected further so that embrasures and contacts reproduce true anatomy, then the entire band is surrounded and stabilized with modeling compound. Anatomy is again checked and contact assured by using a warmed, burnishing instrument (the SSW, FP2A).

Amalgam is then condensed thoroughly with 0.5 and 1 mm. diameter round pluggers (Wesco-Mortenson #2) around the pins; a larger plugger is used only after the pins are covered. Condensing amalgam well around the pins will be found to require painstaking effort, otherwise voids will occur to mar the result. After condensation, and after the occlusal contour is partially carved, the compound is removed, and the matrix is slit in the region of the tuck. The matrix band is opened out, and can then be slipped occlusally enough to snip the edge with crown scissors over each contact spot. With pliers or hemostat forceps gripping the band at either side of this scissor cut, the matrix can be torn through each thinned contact portion for removal without damage to the proximal region of the amalgam. After the restoration is carved and the occlusion is perfected, the patient may be dismissed; polishing can be done at a later time.

FOUNDATIONS OF REINFORCED AMALGAM

If a reinforced amalgam foundation is being built for a subsequent gold or porcelain restoration, reproduction of anatomy at this stage obviously is unnecessary. The band should be cinched by a tuck at the gingival aspect, then stabilized with compound. Once a foundation is condensed, preparation for the restoration can be continued and completed at the same sitting.

A weak, broken-down tooth or root, ringed with 4 to 8 pins and restored with amalgam, is strengthened and splinted against possible splitting. Thus it is far stronger than the familiar dowel and coping casting which actually tends to split the root, and frequently does so. Ample strength and retention may be secured not only for single restorations

such as a porcelain jacket, an inlay, or a crown, but also to support a bridge attachment on almost any solid tooth despite the fact that it has a broken-down crown.

This method has proved successful for salvaging solid, broken-down teeth and roots which are commonly sacrificed as being hopeless, thus preserving function of natural teeth and tooth-borne restorations and appliances.

632 Republic Building

Obtaining efficient soft tissue support for the partial denture base

Aloys C. Metty, D.D.S., M.S., Ann Arbor, Mich.

The form of the bony foundation cannot always be evaluated by viewing the soft tissue ridge. When palpation is used to reveal the true form of the bone, it is found that the soft tissue thickness varies from point to point over the partial denture base area.

The character of the tissue varies as much as the thickness. There may be a pad of very dense fibrous tissue or a soft pad of vascular, fatty or glandular tissue.

The circulatory system lends characteristics to the tissue which may be overlooked. Many small vessels and capillaries connect the partial denture base area with the circulatory system—both through the soft tissue and the underlying bone.[1] Although the tissue, because of its fluid content, is not compressible under a shock load, it will behave as a compressible material under prolonged pressure because of the copious supply of escape and return vessels.

It is remarkable that partial denture bases serve so well. Certain factors tend to make every base different:

1. Dentists differ widely on basic fundamental principles involved in soft tissue support.

2. A wide range of vastly different materials are used for identical purposes.

3. The dental profession is composed of individuals, and the partial denture base usually will be no better than the operator's ability and integrity allow.

Most partial denture bases inserted are acceptable. However, every dentist who has made partial dentures can remember a few which, even though the bases were acceptable, required some adjustments in form or load for a period of several months.

It is my opinion that all the impression technics which are available today, if used methodically, will produce a serviceable base. However, dentists should try to improve these serviceable bases because some patients will not be able to tolerate much less than an ideal base. The serviceable base may do well in a healthy mouth but becomes inadequate as the patient ages or is stricken with disease.

Presented before the Section on Partial Prosthodontics, ninety-seventh annual session, American Dental Association, Atlantic City, N. J., October 3, 1956.

1. Weinmann, J. P., and Sicher, Harry, Bone and bones; fundamentals of bone biology, ed. 2. St. Louis, C. V. Mosby Co., 1955.

STRESS ACCEPTANCE BY THE SOFT TISSUES

Area of the Base • One result of overloading a small area of the soft tissue subjacent to the base is a disgruntled patient. There are several other results; frequently they obscure the real damage. The patient never mentions the change in ridge form or the loss of bone which results from the irritation. However, the dentist should be aware that the irritation of the soft tissue is an indication that the bony foundation is being changed permanently to a less favorable shape. According to Gottlieb and Orban[2] osteoclasts will be mobilized and functioning at the site of irritation within 12 to 24 hours after the irritation is initiated. Surely by the time the patient returns for treatment permanent change has occurred in the base foundation. And, if attempts to alleviate the irritation are not fruitful immediately, the change could be great enough to deprive the base of the support of that portion with a resulting increase in load per unit of area throughout the rest of the base.

Gross load on the partial denture base is unimportant. It is the load per unit of area which must be considered. This value, of course, is determined by dividing gross load by units of area, so by increasing the number of units of area the dentist actually is reducing the load which stimulates or irritates the subjacent tissue. The periphery of the base, therefore, should be extended to the limit established by muscle attachments and certain recognized nonstress-bearing areas of the palate.

Surface of the Denture Base • The surface of the tissue which underlies the base appears smoothly contoured with fairly flat surfaces. However, if equal stress could be applied simultaneously to all points on the entire surface of the soft tissue, it would be found dimpled or curved into the soft glandular, fatty, or highly vascular spots, whereas the thin dense connective tissue covering would remain practically unchanged. So, if it were possible to use a resilient, moldable denture base such as a bag of liquid between the hard base and the soft tissue, the pressure throughout the soft tissue area could be kept equalized at all points. Such a base, however, is not possible at this time.

If the partial denture load is to be transmitted equally to all points in the base area, the denture-bearing tissue must be recorded in the form caused by equalized loading. Then a hard base can be constructed which, until natural causes change the ridge form, will bring an equal amount of force on all points of the soft tissue subjacent to the partial denture base.

At first it would seem that this procedure would involve measuring the amount of impression-making or tissue-displacing force so that it would be equal to the load applied by the patient during mastication and so give the exact amount of displacement of soft tissue to result in equalized pressure in all points of the base. The displacement of the softer portions of the tissue, however, is somewhat like the loading of a coil spring. After it is loaded to a degree a tremendous increase in load is needed to give a displacement. Therefore, the displacement obtained during the impression procedure is sufficient to allow a variable masticatory load to be applied without disrupting harmfully the equalization of load.

The base surface which contacts the supporting tissue should be a mirrored image of the soft tissue form which resulted from equalized loading. This loading should be of a degree sufficient to obtain resistance from the spongy, glandular, fatty, vascular portions of the tissue.

2. Gottlieb, B., and Orban, B. Die Veränderungen der Gewebe bei übermässiger Beanspruchung der Zähne. Leipzig, Germany, Georg Thieme, 1931, p. 197 and 24.

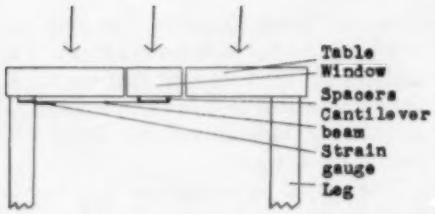

Fig. 1 • Diagram of testing table used by Lawson. Window is mounted on cantilever beam. (Illustration courtesy of Dr. Lawson)

DETERMINING STRESS ACCEPTANCE BY SOFT TISSUE

To determine scientifically the effect of different impression materials and technics on the subjacent tissue is a difficult problem. Lawson[3] and Stromberg,[4] working separately, recently attempted to measure the pressure exerted at a specific point on tissue underlying the denture base. Dr. Lawson stated:

> A basic shortcoming in this approach to measuring masticatory force is that displacement of the window [Fig. 1] is necessary for any strain reading to be recorded. It is this very movement that results in a portion of the window-load being transferred to the surrounding area of the table (or denture), [Fig. 2] thus invalidating any reading that is obtained.

The strain gauge will not measure stress as such, but measures in terms of displacement; it is likely that the displacement obtained could not be converted accurately to a stress value.

A method of measuring the stress point-by-point over that portion of the soft tissue which contacts the denture base would aid in learning much concerning the effect of impression materials on subjacent tissue. However, until a method of measuring stress is devised which does not require displacement, it seems unlikely that these data will be obtained.

Another way to gain information concerning the effect of impression materials on the subjacent tissue is to study the behavior of the partial denture in function. The partial denture base movement can be measured from a reference point on immobilized teeth. The movement obtained when related to the stress applied will disclose the type of support being furnished by the subjacent tissue.

The movement of the free-end partial denture is made up of a lateral movement (rotation in the plane of occlusion) and vertical movement (rotation about a fulcrum line which passes through the posterior abutment teeth).

Because a vertical movement of the partial denture base brings the entire ridge into function, it was decided to construct a measuring device which would detect this movement and apply a stress on the denture which would result predominantly in vertical movement of the base. It is apparent that if the direct retainers function the vertical movement to be studied would have one component

3. Lawson, W. A. Investigation of masticatory force measurement. Thesis, University of Michigan, 1955.

4. Stromberg, W. R. Preliminary study of the measurement of denture base forces against the supporting tissue. Thesis, University of Michigan, 1953.

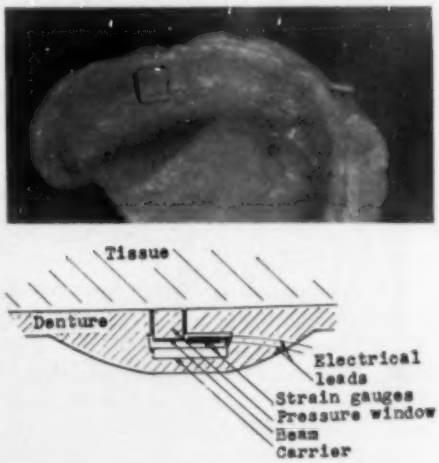

Fig. 2 • Denture used in Stromberg's research showing location of sensory unit. Diagram of sensory unit used in Stromberg's work. (Illustration courtesy of Dr. Stromberg)

—because of the indirect retainer the base could move only toward the subjacent tissue.

An appliance was constructed which had one free-end base (Fig. 3) because this furnished an ideal location of the indirect retainer for measuring purposes. The appliance also furnished an edentulous region next to the indirect retainer which was convenient. By placing pressure at this point, with the apparatus assembled, the seated position of the indirect retainer could be checked.

A casting which overlaid the anterior teeth supported a beam (Fig. 4). The beam projected to the occlusal rest of the indirect retainer unit (Fig. 5). A strain gauge was cemented to both upper and lower surface of the beam so that any deflection would be recorded and so that error which one strain gauge would have allowed was canceled out.

Stress was applied to the partial denture base in the region of the first replaced tooth (next to the minor connector) by having the patient close on a bite meter (Fig. 6 and 7) in a normal chewing cycle.

The beam and bite meter were mounted and calibrated (Fig. 8, above left) before each recording so that the readings could be converted to distance and pounds respectively. The strain gauges of the beam and bite meter were wired to a measuring device (Fig. 8, below) which functioned on a Wheatstone bridge principle and gave simultaneous recordings of the beam deflection and bite meter distortion.

In this preliminary study five recordings were made of four different bases. Two types of impression material were used. The bases were made by powder-liquid addition of activated acrylic resin which resulted in an accurate base-framework relationship.

The first recording was of an acrylic base formed on a stone cast which was made from an alginate impression. Sufficient bulk of material was used to preclude any tissue pressure. The base was worn two weeks with no occlusion. The record (Fig. 9) indicated that the appliance was seated and in function rotated so that the indirect retainer lifted 0.25 mm. from its seat.

The second recording was of an acrylic base formed on a stone cast which was made from a fluid wax impression. The record (Fig. 10) indicated that the appliance was not seated and in function moved bodily toward the teeth and subjacent tissue.

In the third recording the same acrylic base was used as in the second recording. The base was worn by the patient two more weeks and retested. The record (Fig. 11) indicated that the appliance was still unseated slightly.

The fourth recording was of an acrylic base formed on a stone cast which was made from a fluid wax impression. The record (Fig. 12) indicated that the appliance was almost seated. In function a very slight movement of the indirect retainer toward the teeth was detected and then a very slight rotation—a magnitude of 0.04 mm. each way.

The fifth recording was of an acrylic base formed on a stone cast which was made from a fluid wax impression. This wax was allowed to flow 20 minutes after the last addition. The record (Fig. 13) indicated complete seating and practically no rotation during function.

It should be emphasized that the bases used in this experiment were alike in one characteristic. Tissue coverage was maximum. The characteristic which differed was the internal form of the base or tissue-base relationship.

The base used for record 1 was adapted to the soft tissue in "rest" form. Some regions of the ridge were not ready to offer support at the rest form. When the load was applied, the firm regions offered support immediately, but their total resistance was not sufficient to prevent movement of the base. As the base moved toward the ridge, other less firm regions

Fig. 3 • Appliance with one free-end base. Measuring point located well away from fulcrum line facilitated measuring procedure

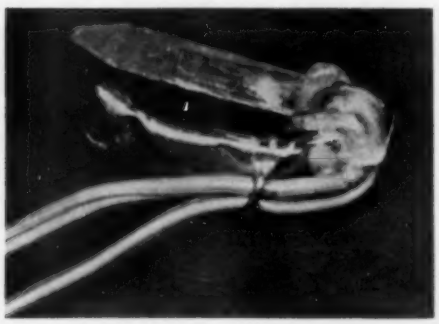

Fig. 4 • Casting which overlaid anterior teeth and supported beam on which two strain gauges were cemented

Fig. 5 • Denture and beam assembled on cast. Beam is held in exact position and touches occlusal rest of indirect retainer

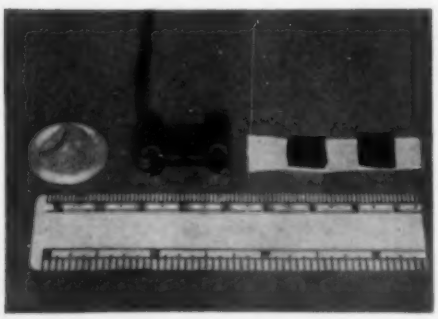

Fig. 6 • Bite meter, pads and covering before assembling

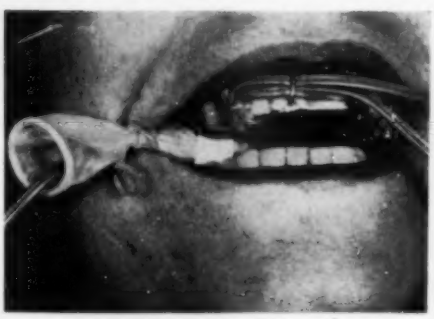

Fig. 7 • Patient with partial denture, beam and bite meter in place

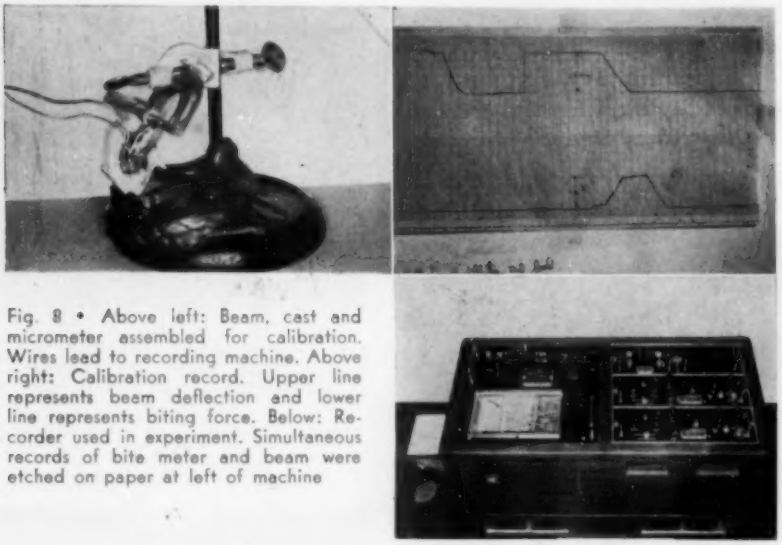

Fig. 8 • Above left: Beam, cast and micrometer assembled for calibration. Wires lead to recording machine. Above right: Calibration record. Upper line represents beam deflection and lower line represents biting force. Below: Recorder used in experiment. Simultaneous records of bite meter and beam were etched on paper at left of machine

offered support until the resistance offered equaled the load applied.

The amount of movement was not great. However, the use of impression materials which are capable of displacing tissue revealed that a displacement of 1 to 3 mm. is not unusual for some portions of the base-supporting region. It is evident that those portions which required much displacement were not functioning efficiently, and the load per unit of area was increased on the supporting regions. This is typical of the serviceable base. It will do very well as long as the load per unit area does not exceed the physiologic limit. It would be interesting to know what percentage of the ridge covered by the base was functioning.

This base which fits the ridge in "rest" form also will cause excessive flow of tissue. The firm regions offer support immediately but the total resistance is not sufficient to prevent movement of the base. As the base continues to move, the soft tissue covering is subjected to pressure enough to cause it to flow and thin out. When the pressure is released, this tissue regains its position only to be trapped when the next masticatory stroke is made.

The action of the partial denture in record 2, 3 and 4 indicated that the framework was never seated. The fluid wax used as the impression material was so resistant to flow that the supporting tissue was overdisplaced at the time the impression was made. The defect is not of the material or the accepted technic. The overdisplacement shown in recording 2 was deliberate, but the overdisplacement shown in recording 4 was not planned. More will be said later about this technic which will point up the errors involved in the registration for base 4. It is sufficient at this point to note that when using an impression material of some body, one which will exert a force on the soft tissue, the tissue displacement obtained must be controlled.

The impression registration for the partial denture base for record 5 was made in the same way as for record 2, 3 and 4, except that after the last application of wax the tray was held in position for 20 minutes. During the impression procedure secretive glands in the base area

which normally are engorged with their fluids were emptied. Also, excess fluids in the base-supporting tissue (notably the fatty padded palatal tissue) were deposited in the blood stream by way of the capillaries from the region through both soft tissue and bone. Therefore, when the base attempted to move toward the supporting soft tissue it was resisted immediately by 100 per cent of the region which it covered. Also, because equal stress was being applied to all points of the soft tissue simultaneously, flow of tissue was minimum.

It is true that some pressure was necessary to accomplish the change in form which results from the elimination of this transient bulk from the soft tissue. It is evident, however, that after the form is once accomplished a minute amount of force is all that is required to maintain it. If this were not true, the force of the tissue against the partial denture base would have prevented the denture from seating. The recording indicated that the base and framework were seated accurately.

FLUID WAX TECHNIC

No impression technic will be outlined at this time and advocated as the only one which will cure all impression faults. The results of this preliminary study, however, seem to indicate that a partial denture base will function most efficiently if the subjacent soft tissue has been molded to a supporting form by the impression technic. Applegate[5] has presented the fluid wax impression technic in a step-by-step outline and given a detailed explanation of both the objectives and the procedure to use.

The fluid wax impression will produce a base which is adapted to the supporting form, which is extended correctly to maximum coverage and which requires practically no postinsertion adjustment. The technic, however, has two faults which should be mentioned:

1. There is no way to be sure that the subjacent tissue has caused enough flow of wax to be released from an impinged condition.

2. The time required to complete the step-by-step procedure is excessive and deters many dentists from its use.

If the objectives are kept in mind and obtained simultaneously by changing the procedure, both of these faults can be lessened. The tray can be roughened and fluid wax quickly applied, in excess of the amount needed, within the first four or five minutes of the appointment. After this, 20 to 25 minutes can be used for displacement of excess wax from the base. This wax will migrate to the periphery and, by the movements already described by Dr. Applegate, will be turned to the outside of the tray for removal. Extension of the tray, reinforcement of the wax and the other details of the technic can be accomplished during this flowing procedure.

The records obtained in this preliminary study indicated that some bases may require a 20 minute flowing period after the last addition of wax. This is most certainly true if the wax is added to the crest of the ridge area of the impression. Therefore, after the initial application of the excessive amount of impression wax, no more is added except directly on the periphery as a contouring measure. Thus, 25 to 30 minutes should allow completion of all but the most difficult fluid wax impressions for the partial denture base.

RECORDING SUPPORTING FORM OF SOFT TISSUE

The requirements of a technic for recording supporting form of soft tissue for the partial denture base are given in the following paragraphs:

5. Applegate, Oliver. Essentials of removable partial denture prosthesis. Philadelphia, W. B. Saunders Co., 1954.

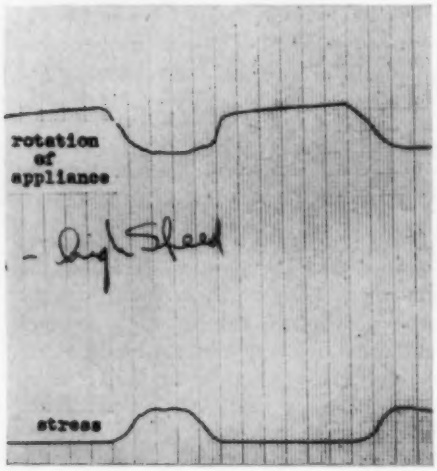

Fig. 9 • First recording. Base made with alginate impression material

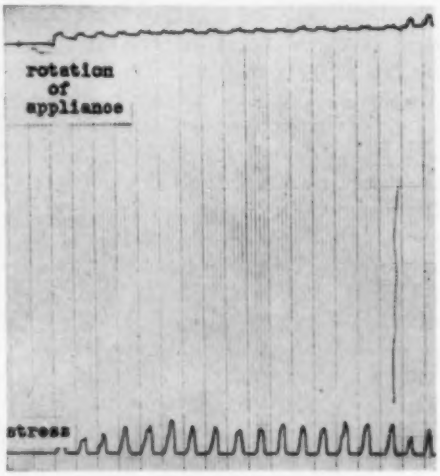

Fig. 10 • Second recording. Base made with fluid wax impression material

1. The tray should be keyed to the remaining teeth so that it can be placed and replaced accurately. The partial denture framework with wax or plastic support for the impression material will meet this requirement. If the base area is to be recorded in its supporting form before the casting is completed, a plastic tray keyed to the remaining teeth is acceptable.

2. The impression technic should allow the impression to be corrected, examined, reinserted for correction, examined and corrected as many times as necessary to obtain maximum coverage short of moving tissue and controlled displacement of subjacent tissue. If the operator likes to use cream or any material which chemically "sets," he then would have to correct periphery or defects with a thermoplastic material.

3. The technic should allow the operator to have complete control over the seating pressures and orientation of the impression tray. In other words, the tray should be carried into the mouth, seated by relating the tray to the teeth and held in position while the material is registering tissue form. I cannot imagine a condition which would necessitate occlusal contact or biting by the patient to seat or retain the tray.

The order of procedure, whether it is for a new partial denture or rebase of a partial denture now in service, is to position the framework on the teeth and at the same time record the subjacent tissue in the form the operator desires. The occlusal relationship is not accurate enough to use at this time. If the partial denture is being rebased it does not necessarily follow that if the framework is repositioned to the teeth the occlusion will return to the satisfactory relationship it had when new. Migration, abrasion and extrusion of teeth most certainly will upset this relationship.

4. The impression technic should allow the operator to extend the periphery in a controlled manner to maximum coverage and by planned steps to determine with accuracy the amount of extension permissible in a given mouth. The impression material used will dictate the steps which the operator must follow to adhere to this requirement. The alginate

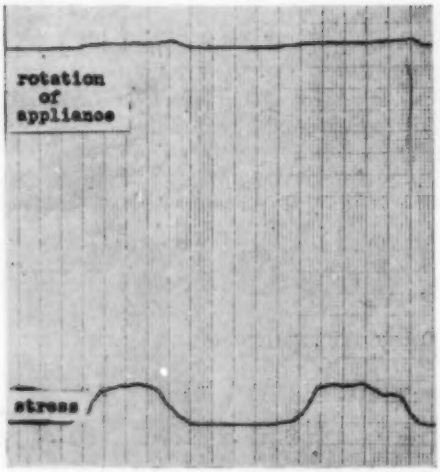

Fig. 11 • Third recording. Base for second recording worn two more weeks

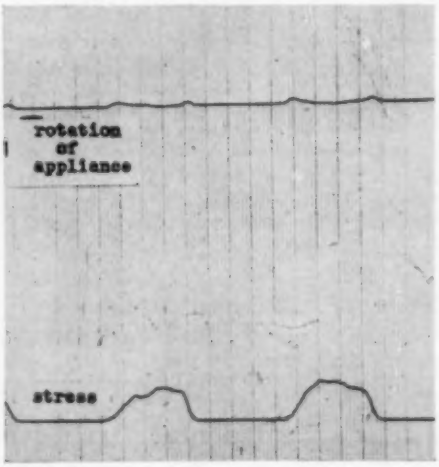

Fig. 12 • Fourth recording. Base made with fluid wax impression material. Indirect retainer moved toward tooth when load was applied to base

impression is little better than the tray used. The material has no body to force between cheek and tuberosity or mandible and tongue, so the tray must open the way and furnish the freedom to flow, and support the material against the ridge until "set" occurs. A fluid wax, however, will migrate against a bulky tongue or cheek and project beyond the tray. This projection then can be supported by extending the tray. By repeated flowing of the impression material and extension of the tray, maximum coverage can be obtained even though the starting tray seemed rather inadequate.

5. The impression technic should be practical as well as possible. The impression procedure which requires only five minutes for registration but several adjustment periods after delivery of the completed partial denture is not practical. Likewise the impression procedure which requires an hour or more for registration is not practical even though adjustments after delivery are minimized. To preserve the supporting tissue, an impression technic which will reduce post-insertion adjustment should be used.

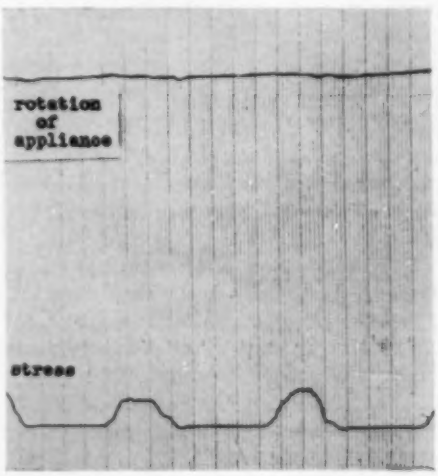

Fig. 13 • Fifth recording. Base made with fluid wax impression material. Indirect retainer showed very slight movement when load was applied and removed

SUMMARY

The structure and stress acceptance characteristics of the soft tissue underlying the partial denture base have been

considered. Records were made of the displacement of five partial denture bases in function. The records obtained support the concept of the soft tissue presented, and indicate that an impression technic which allows controlled displacement of transient tissue bulk will provide the most stable partial denture base. The accepted fluid wax impression technic has been studied. Procedure changes are suggested which will tend to make the technic more practical for general office use.

216 South State Street

The Evanston dental caries study. XVIII. Report on the permanent teeth dental caries experience rate of the children in the control area (Oak Park, Illinois)

I. N. Hill, D.D.S.; J. R. Blayney, D.D.S., and Walter Wolf,* B.S., Chicago*

In our recent publication[1] it was stated that the dental examinations in the control area, Oak Park, Ill., would not be completed until the latter part of 1956 after which time the results would be made known.

It is the purpose of this report to compare the permanent teeth dental caries experience rates of 2,051 children, 6, 7, 8, 12, 13 and 14 years of age, examined in the control fluorine-free area (Oak Park, Ill.) in 1947 with the results of 2,537 dental examinations made nine years later in the same area. The same technic of examination was used on children of identical age, with two of the original examiners out of a total of three.

METHOD

Blayney and Tucker,[2] in an earlier publication, described the objectives of the study and explained the purpose of the Oak Park survey. According to the protocol of the study, the children of the control area were to be examined again in 1958. The program was altered when it became known that fluorine would be added to the water supply of the city of Chicago which, in turn, supplies water to the village of Oak Park. Therefore, in view of the Chicago situation, it was decided to begin the Oak Park examinations on Jan. 9, 1956. That portion of the Chicago water system supplying the south side of Chicago was fluoridated May 1, 1956, whereas water was going to the west

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The classification and tabulation of all data has been supervised by C. L. Bridger, Chief, and C. Lorenzeni, Bureau of Vital Statistics, Illinois State Department of Health.

*Zoller Memorial Dental Clinic, University of Chicago.

1. Hill, I. N.; Blayney, J. R., and W. Wolf. Evanston dental caries study. XVI. Reduction in dental caries attack rates in children six to eight years old. J.A.D.A. 53:327 Sept. 1956.

2. Blayney, J. R., and Tucker, W. H. Evanston dental caries study II. Purpose and mechanism of the study. J. D. Res. 27:279 June 1948.

side of Chicago and 28 suburbs, including Oak Park, was not fluoridated until Aug. 1, 1956. Examinations were conducted so that pupils of the elementary schools were examined in the interim from January to May. In September and October the pupils in one parochial school were examined, and in November the students 14 years of age from the public high school were examined. The entire examination program was completed Nov. 14, 1956.

It should be readily apparent, since only a small portion of the students in the fluoride-free control area were observed after the beginning of water fluoridation in Oak Park, (Aug. 1956), that the use of fluoride-containing water for such a short time would have no appreciable effect on the DMF rate for the entire group of 2,537 children. Also it should be noted that from time to time water obtained from the western suburbs of Chicago has been analyzed for its fluorine content. Except for the time immediately after the initiation of the Chicago fluoridation program, the F content has been well below the desired optimum level of 1.0 ppm. It should be evident to all that the residents of these areas will not receive the desired benefit if the fluoride content of the water is not maintained at the optimum level.

The control area was not studied every year. It was not necessary to do so in as much as Evanston and Oak Park are subjected to the same advertising campaigns, have a similar economic level, participate in comparable educational programs, and so forth. Therefore any change in the DMF rate between the first (1947) and second (1956) studies in Oak Park would be applicable to Evanston, and if these changes were significant it would be necessary to adjust the Evanston figures accordingly.

OBSERVATIONS

It is shown in Table 1 that the DMF rates observed in 1947 and in 1956 are remarkably close in view of the nine year period between examinations. The difference between the 1947 and 1956 rates for

Table 1 • DMF rate of permanent teeth per 100 children according to (1) age at time of first exposure to fluoridated water, (2) number of years exposed, and (3) age at time of examination

Year	No. exam.	Years of fluoridation	Age at time of examination: Age six — Age at 1st exposure	Age six — DMF	Age six — Per cent reduction from 1946	Age seven — Age at 1st exposure	Age seven — DMF	Age seven — Per cent reduction from 1946	Age eight — Age at 1st exposure	Age eight — DMF	Age eight — Per cent reduction from 1946
	Evanston, Ill.										
1946	1,991	None		46.85*			153.49			249.93	
1948	2,034	1	5	23.54	49.76	6	103.58	35.52	7	194.09	22.34
1950	1,244	3	3	15.33	67.28	4	80.93	47.27	5	153.52	38.58
1951	1,853	4	2	12.36	73.62	3	66.97	56.37	4	161.40	35.42
1953	1,457	6	Birth	14.73	68.56	1	53.35	65.25	2	122.49	50.99
1955	1,376	8	Pre-conception	6.58†	85.96	Gestation period	40.92†	73.34	1	120.32†	51.85
	Control area (Oak Park, Ill.)										
1947	1,031	None		26.89			102.63			222.44	
1956	1,293	None		22.54			128.71‡			242.55	

*This figure results from the very high DMF rate of 87.91 found in one school in 1946.
†Difference between 1946 and 1955 rate is statistically significant.
‡Difference is statistically significant.

Table 2 • Rate of permanent teeth per 100 children according to (1) age at time of first exposure to fluoridated water, (2) number of years exposed, and (3) age at time of examination

Year	No. exam.	Years of fluoridation	Age at time of examination: Age twelve			Age thirteen			Age fourteen		
			Age at 1st exposure	DMF	Per cent reduction from 1946	Age at 1st exposure	DMF	Per cent reduction from 1946	Age at 1st exposure	DMF	Per cent reduction from 1946
	Evanston, Ill.										
1946	1,701	None		763.16			1,009.59			1,165.88	
1949	1,769	2	10	681.99	10.64	11	857.02	15.11	12	1,086.84	6.78
1952	1,554	5	7	596.87	21.79	8	795.49	21.21	9	1,019.84	12.53
1954	1,326	7	5	560.20*	26.59	6	758.52*	24.87	7	997.60*	14.43
	Control area (Oak Park, Ill.)										
1947	1,020	None		774.29			970.00			1,194.64	
1956	1,244	None		713.09†			1,004.96†			1,135.77†	

*Difference between 1946 and 1954 rate is statistically significant.
†Difference is not statistically significant.

the 6 and 8 year old children are not statistically significant. The seven year old children in 1956 show a higher permanent tooth DMF rate than the seven year olds in 1947. The difference is statistically significant. The children 12, 13 and 14 years of age, Table 2, have only minute differences between the 1947 and 1956 rates. These are not considered to be significant. The DMF rates and percentage reduction from year to year for the Evanston children of all age groups shown in Tables 1 and 2 have been published in previous reports but not in this tabular form which shows the age at the time of first exposure to fluoride and number of years fluoridation has been in effect.

DISCUSSION

In the dental profession the consensus seems to be that dental caries prevalence is on the increase except for the fluoride areas. Brekhus,[3] in comparing the caries experience of freshmen entering the University of Minnesota, reported the average number of teeth per student affected by dental caries in 1929 to be 9.95; in 1939 as 11.8, and in 1949 the number of affected teeth had increased to 13.7 per student. Unfortunately Brekhus failed to state the age range, mean age, or average age of the students comprising each of these groups. In an earlier publication[4] he did state that average age of the 1929 group was 18 years and that the 1939 group was "slightly older." From these data we are unable to compare the caries experience of like age groups to determine if there is a significant increase rather than an apparent increase which is the result of age differences and therefore a longer period of exposure to the risk of caries. Wisan and Chilton[5] also have observed an increase in caries prevalence when they compared the observations in surveys conducted in 1933-34 and 1944-46. Here again the methods employed were not exactly comparable;

3. Brekhus, Peter J. Deterioration of human teeth. J.A.D.A. 42:424 April 1951.

4. Brekhus, Peter J. A second census of dental conditions in University of Minnesota freshman students. J.A.D.A. 28:1126 July 1941.

5. Wisan, J. M., and Chilton, N. W. Studies in dental public health administration. IV. Dental caries experiences of New Jersey school children. J.A.D.A. 37:519 Nov. 1948.

however, they concluded that "susceptibility to dental caries appears to be increasing among New Jersey school children."

We are now reporting that over a nine year period we found no significant change in the caries prevalence rates in the 6, 8, 12, 13, and 14 year old children. We did note a significant increase in the prevalence rate in the seven year old children. If it is true that caries prevalence in the past has been increasing, then these observations raise some important and interesting questions; namely: has the oral health educational campaign succeeded in teaching the school children to practice a regimen which will reduce the prevalence of caries or do the new therapeutic dentifrices accomplish what the advertisements claim? Is the use of the between meal "pick up" on the decrease? Are the dental survey programs commonly practiced in many communities beneficial when results are measured accurately in terms of (1) betterment of oral health, (2) student loss of time from school because of dental problems, and (3) the reduction in the caries prevalence rates? Sandell[6] has pointed out that unless dental inspection succeeds in motivating the child and parents toward better dental care and also in determining dental health status, the value of inspection is doubtful. Does the apparent status quo in the DMF rate in Oak Park permit the assumption that some inhibitory factor has been active? If so we have no specific ideas as to what it may be. Before these questions can be answered with any degree of certainty, additional surveys are needed in which individuals of like ages are compared in communities where the social, ethnic, economic, and cultural values are comparable.

CONCLUSION

In view of the results of the control area dental examinations of 1947 and 1956, there being no statistically significant change in the dental caries experience rates over a nine year period, no adjustment was made in the Evanston rates. It is concluded that the reduction in the dental caries experience rates of the children of the study area[1-7] (Evanston, Ill.) is believed to be due solely to the sodium fluoride in the Evanston water.

6. Sandell, Perry. Progress in school dental health education. J. School Health. 26:67 Feb. 1956.

7. Hill, I. N.; Blayney, J. R., and Wolf, W. Evanston dental caries study. XV. Caries experience rates of two groups of Evanston children after exposure to fluoridated water. J. D. Res. 36:208 April 1957.

Questing Humanist • The great mystery is not that we should have been thrown down here at random between the profusion of matter and that of the stars; it is that, from our very prison, we should draw from our own selves images powerful enough to deny our nothingness. *André Malraux.*

An evaluation of Kasdenol (Clorpactin)

S. Leonard Rosenthal, D.D.S., Philadelphia

From time to time, proprietary preparations are advertised and distributed to the dental profession with broad claims of bactericidal properties and therapeutic efficacy. The practitioner and the public spend millions of dollars annually on worthless nostrums, and often delay initiation of proper treatment in a futile pursuit of an easy short cut to oral health. We are obligated, therefore, to investigate such material and to appraise its value before discarding technics and medicaments which already have proved satisfactory.

Kasdenol (also known as "Clorpactin," a brand of "monoxychlorosene") is distributed by the Kasdenol Corporation as a germicidal mouthwash, an aid in the treatment of periodontal disease, a cure for herpes simplex, an efficient solvent of necrotic tissue, and as a bactericide and fungicide for oral infections.

According to a published report,[1] a 0.33 per cent solution of Kasdenol is lethal to *Micrococcus pyogenes, Bacillus anthracis, Aerobacter aerogenes, Serratia marcescens, Pasteurella pestis, Hemophilus pertussis, Streptococcus faecalis, Shigella dysenteriae* and certain fungi if a culture of any of them is mixed in a test tube with ten times the amount of Kasdenol and allowed to remain for 30 minutes.

In addition to a generous quantity of his product, the manufacturer kindly supplied us with literature containing his claims, tests and results. The literature was especially welcome, since little has appeared in dental or medical journals.

PROCEDURE

The package contains a fine white powder with a strong chlorine odor and a plastic measuring spoon which holds approximately 8¼ grains (0.54 Gm.) of the powder. The manufacturer's directions state that a level measureful of powder in 6 ounces of lukewarm tap water is to be used as a rinse, each mouthful being held for 30 seconds. This routine is to be followed three times a day.

One level measureful of the powder was dissolved in 6 fluid ounces (177.4 cc.) of distilled water at 37° C. This approximates a 0.3 per cent concentration. The solution was not complete. Numerous white granules remained undissolved, giving a cloudy appearance to the mixture. The Beckman pH meter showed an average pH 7.2.

Rinsing the mouth revealed a strong chlorine flavor followed by a transitory numbness and loss of taste.

Application of 2 drops of the solution to the conjunctival sac of the left eye of two rabbits and kept in close contact for two minutes caused only slight in-

Professor of oral diagnosis, Temple University School of Dentistry.

1. de Almeida, F. P. Use of Clorpactin WCS 90 in microbiology. Rev. paulista med. 43:444 Nov. 1953.

flammation which disappeared within 90 minutes.

The bactericidal properties were determined by the motility test which has been described in detail elsewhere.[2,3] Some of the oral flora cannot be grown easily on artificial media. Therefore antibacterial efficiency against such microorganisms may be determined more conveniently and more accurately by observation of changes in motility using natural media. Complete loss of motility has been shown to be an indication of loss of pathogenicity.[4,5] The motility test has been used in the state of New York for field testing.[6] An efficient bactericide will stop motility immediately on contact.[2,3]

Two standard loopfuls of a freshly mixed Kasdenol solution prepared as described was tested with an equal quantity of fresh unstimulated saliva. Motility of spirochetes, vibrios and motile bacilli was generally unimpaired 15 minutes after contact. Doubling the quantity of the powder (approximately a 0.6 per cent concentration) did not change the results.

Two cubic centimeters of a freshly prepared 0.3 per cent solution of Kasdenol was placed in a test tube containing 2 cc. of fresh unstimulated saliva, mixed by rapidly rolling the test tube between the hands for five seconds, and allowed to remain in contact for 15 minutes at room temperature. Mixing was repeated every five minutes. Aerobic cultures then were made by transferring two loopfuls of the mixture into a test tube containing 5 cc. of brain-heart infusion broth. Anaerobic cultures were made in a like manner using Brewer's broth. All tubes showed growth after 18 hours of incubation at 37° C. After 48 hours, the bacteria were isolated for identification. Recovered were the following: *Streptococcus viridans,* anhemolytic streptococci, *Staphylococcus pyogenes* var. *aureus,* and *Neisseria catarrhalis.* The 0.6 per cent solution eliminated *N. catarrhalis.*

Stewart[7] investigated the effect on necrotic tissue. The remains of necrotic pulps were placed in sterile Petri dishes, and sufficient freshly mixed 0.3 per cent Kasdenol solution was added to cover the tissue completely. The plates remained at room temperature overnight. There was no visible change. When the necrotic tissues were placed in a similar quantity of sodium hypochlorite solution N.F., they were totally dissolved in 15 minutes.

Material from a thrush infection was obtained by scraping the lesions on the buccal mucosa of a child. The scrapings were placed in a sterile Petri dish and covered with a 0.6 per cent solution of Kasdenol for 15 minutes at 37° C. The material was removed and placed in Sabouraud's medium. After 72 hours, *Candida albicans* was identified.

Three individuals with single herpetic ulcers were given Kasdenol and instructions to mix as directed, to rinse every three hours, to hold each mouthful at least 30 seconds, and to use 6 ounces at each rinsing. There was no change in 24 hours. The patients then were instructed to continue the rinsing three times a day. A week later, all lesions had disappeared. Normal saline solution gave identical results in two other patients.

DISCUSSION

Since Kasdenol solution in the conjunctival sac caused no more than a transient inflammation, it can be concluded that

2. Rosenthal, S. L. Effect of medicaments on the motility of the oral flora with special reference to the treatment of Vincent's infection. J. Periodont. 8:71 July 1937.

3. Rosenthal, S. L. Effect of medicaments on the motility of the oral flora. II. Supplementary report. J. D. Res. 20:285 June 1941.

4. Eagle, H. J. On spirocheticidal action of arsphenamines on Spirocheta pallida in vitro. J. Pharm. & Exper. Therap. 64:164 Oct. 1938.

5. Kest, C. C.; Peterson, C. W., and Kolmer, J. A. Treponemicidal activity of arsphenamine and neoarsphenamine in vitro with special reference to citrated blood and suggested method for prevention of transfusion syphilis. Am. J. Syph., Gonor. & Ven. Dis. 23:15[illegible] March 1939.

6. Buchbinder, L., and Zaretsky, P. Cessation of bacterial motility as rapid test for germicidal action. Am. J. Pub. Health 41:537 May (pt. 1) 1951.

7. Stewart, George G. Personal communication.

it would not be injurious to oral tissues if employed judiciously. None of the patients who used it for a week showed any irritation which could be attributed to the medicament.

The bacteriologic report of the manufacturer is not pertinent to the treatment of oral disease. Few of his test organisms are likely to be found in the mouth more than occasionally, and the majority are not pathogenic to man. Nor is the method of testing comparable to clinical conditions. Instructions suggest that 6 ounces of the solution be used as a mouthwash, each mouthful being held for 30 seconds. Since a mouthful is about 1½ ounces, the total time of use would be two minutes. The constant flow of saliva rapidly dilutes and removes the medicament, so any Kasdenol remaining after rinsing would be dissipated quickly. The laboratory results were based on a 30 minute contact.

The large quantity of organic and inorganic matter always present in the mouth impedes the action of any medicament. A valid test must include such substances. This is especially true when testing chlorine compounds which are rapidly rendered inert by such material.[8] Reactions in a test tube may not be comparable to reactions in the mouth unless similar conditions prevail.

The seat of oral infections is not on the surface, but in microscopic crevices in the tissues. Such places filled with saliva, tissue fluids, degradation products and bacteria can be reached only by diffusion. It is not conceivable that the contents of such spaces can be replaced by more than 50 per cent simply by the act of vigorous rinsing. An equal amount of drug and saliva is much more realistic for test purposes than a ten to one proportion of drug and culture broth.

The manufacturer claims a reduction in the number of oral bacteria after use of his product. There is no doubt of the truth of this assertion. It has been known for many years that a vigorous rinsing with tap water or the proper use of a toothbrush will reduce the number of oral bacteria. Even smoking a cigarette will reduce the bacterial count 50 per cent temporarily.[9]

There is not sufficient available information to explain the different reactions of the two solutions used to dissolve necrotic tissue. The terms Kasdenol, Clorpactin and monoxychlorosene are not descriptive, nor is the composition available in any of the usual sources of pharmaceutical information. Sodium hypochlorite solution N.F. is an alkaline solution containing 5 per cent available sodium hypochlorite. It is available commercially as Zonite.[10] Whether the higher alkalinity or a greater hypochlorite content gives the increased efficiency cannot be determined at this time.

Chlorine solutions turn amalgam fillings black. Although such discoloration can be removed by repolishing with pumice, it is an inconvenience to the patient.

Our observations of poor germicidal power of the mouthwash and its low propensity for dissolving necrotic tissue suggest that the beneficial clinical results reported by other investigators[11, 12] were related to other factors. The mechanical cleansing effect provided by rinsing the mouth frequently with a fluid might be one such factor.

SUMMARY

Solutions of Kasdenol (Clorpactin) were examined for bactericidal properties in the presence of saliva by observing the

8. McCulloch, E. C. Sterilization and disinfection, ed. 2. Philadelphia, Lea & Febiger, 1936, p. 336.

9. Appleton, J. L. T. Bacterial infection with special reference to dental practice, ed. 4. Philadelphia, Lea & Febiger, 1950, p. 625.

10. Grossman, L. I. Root canal therapy, ed. 4. Philadelphia, Lea & Febiger, 1955, p. 223-225.

11. DeStefano, T. M. Summary of cases using Clorpactin WCS 90 for various oral lesions. J. New Jersey D. Soc. 25:49 April 1954.

12. Zwerling, M. Clorpactin WCS-90: a new antiseptic; preliminary report. A.M.A. Arch. Otolaryng. 62:157 Aug. 1955.

effects on motility of oral bacteria, by direct culture of microorganisms from saliva exposed to Kasdenol and by clinical application.

Motility of spirochetes, vibrios and bacilli generally was not impaired after 15 minutes' exposure to the test solutions.

Cultures of saliva exposed to solutions of 0.3 per cent and 0.6 per cent Kasdenol for 15 minutes were positive for bacterial growth. *Str. viridans,* anhemolytic streptococci, *Staph. aureus* and *N. catarrhalis* were recovered from the cultures.

Immersion of scrapings from a thrush infection in 0.6 per cent Kasdenol for 15 minutes did not inhibit growth of *C. albicans.*

Frequent rinsing with Kasdenol 0.3 per cent and with normal saline solutions did not reduce the usual time of resolution of herpetic lesions.

Necrotic pulp tissue was not dissolved by exposure to Kasdenol solutions overnight, but was completely dissolved by sodium hypochlorite solution N.F. in 15 minutes.

A dental health education program for the high school student

Alan A. Axelband, D.D.S., Brooklyn

Dental health education of the public—children, youth, and adults—is a primary concern of the dental profession, which recognizes the connection between knowledge, motivation, good health habits, and good dental health. Children's Dental Health Week has been effective throughout the country in educating children of pre-elementary and elementary school age and their parents. The high school student, however, not only has needs and interests different from those of younger children but also does not wish to be counted among them.

Yet high school students need dental health education. Examinations of their mouths have disclosed the frequent incidence of rampant caries, gingivitis and poor oral hygiene. Moreover, the educational technics which have been used to appeal to younger children do not result in effective motivation for high school students.

PROGRAM PLANNING

The special need of high school students for guidance in dental health matters prompted the Oral Hygiene Committee of Greater New York, a co-ordinated committee of the First and Second District Dental Societies, to arrange a series of dental health educational programs for them. Four such programs having been held, it is felt that the experience of the Oral Hygiene Committee will be helpful to other dental societies which wish to reach high school students with a dental health educational program.

The purpose of the project was to find the content and method of dental health education best suited to the needs and

interests of secondary school students and to present it in their regular school program during the school day. The first, or pilot, school program was held in May 1955 at Midwood High School in Brooklyn. Subsequent programs were held in October 1956 in George Washington High School in Manhattan, and in May 1957 in Wingate High School in Brooklyn and in Taft High School in the Bronx.

The program, which was made up of two parts, took place on two consecutive days. On the first day there were two talks before special assembly groups in the school auditorium—one in the morning and one in the afternoon. Each assembly had a different dentist as a guest speaker. The talk was supplemented by a film on some phase of dentistry.

On the second day a dental health exhibition consisting of five table clinics on various aspects of dental health care was set up in two gymnasiums. Since it had been learned from previous programs that greater attention was achieved where the boys and girls were separated, similar exhibitions were set up in the boys' and girls' gymnasiums. In each location table clinics were set up covering (1) operative dentistry and endodontics, (2) orthodontics, (3) periodontics and nutrition, (4) toothbrushing demonstration and (5) surgery-anesthesia-roentgenography.

Many of these table clinics were given by specialists in the various fields. General practitioners took over in whatever field they had a special interest. Each clinician tried as far as possible to correlate his presentation with the basic sciences which high school students study, and to arouse interest in dentistry as a career. He presented his clinic as he would to his fellow dentists, except that he modified it to meet the comprehension of the high school student. The students, who had been exposed to various types of dental procedures, learned about the scientific and mechanical principles that had been applied to the achievement of dental health. This procedure was planned to motivate the students to apply the principles and practices of preventive dentistry—good oral hygiene, proper diet and regular dental care. It also presented dentistry as a challenging career which offers a great variety of problems, activities and opportunities.

Over a period of three years, the Oral Hygiene Committee has evolved a procedure in the school which has been found to be very effective. As each class arrived at the gymnasium for a regular period of health education, the class was divided into five groups. Within a 40 minute period, each student visited and participated in each clinic. At the sound of a whistle, the groups rotated to a different table clinic.

The physical set-up of each table was planned so that the students were close to the materials and the dentist. At the back of each table and leaning against the wall was a large beaverboard—5 by 8 feet—covered with a colorful cloth. On this board were placed several large illustrations, enlarged roentgenograms and pictures related to a particular field. Many models, dental appliances, instruments and visual aids pertaining to the subject were placed on the table. Some of the clinicians had projectors and showed slides. The materials for the board and the table were carefully selected so that they would be meaningful to the students and would relate directly to the particular clinic.

While the program was going on in the gymnasiums, there was no interruption of the schedule of the school. This pleased the administrative department of the school. Since every student has a period of health education every day, the entire population of the school participated. There was, therefore, very little interference with school routine.

Each clinician was assigned to two periods—about one and one half hours. Since the period schedule had been obtained from the school, it was possible

to give definite time assignments to each clinician. After completing two periods, he was free to leave. This worked out well because it did not overtax any one individual. It had been learned from previous programs that more than two classroom periods was too much for men unaccustomed to the physical demands of classroom teaching.

At the conclusion of each program, a conference was held to evaluate the results. This evaluation was based on questionnaires given to the students, and on opinions submitted by participating dentists, dental hygienists, health education teachers and members of the Board of Education who had been present. Each year the important features of the evaluation were carefully recorded and put into practice the following year.

As a result of the experience of the Oral Hygiene Committee with the high school programs described earlier, several recommendations can be made to groups of dentists contemplating similar programs.

A successful program requires careful selection of personnel, thorough preparation to insure proper presentation of materials at the high school level, and thorough planning with the administration of the school to make certain that the program will be well integrated with school activities.

PRELIMINARY PROCEDURE

From the point of view of setting up a high school program, it can be seen that the personnel required will depend on the size of the community and the size of the school involved. To cover a normal school day in a large city high school it will be necessary to have 40 dentists or dental hygienists to staff a program for both boys and girls. The number may seem large at first, but if the clinicians are given definite assignments of a limited length of time recruitment will not be difficult.

Since a high school audience is different from that of an audience of dentists, it is necessary to instruct the clinicians in psychological approach and in method of procedure. It was found that the study of a briefing sheet by the clinicians enabled them to approach their specific task with more assurance. The following briefing sheet in mimeograph form was sent to each clinician:

HELPFUL HINTS FOR CLINICIANS IN HIGH SCHOOL PROGRAM

PROCEDURE

The entire class is divided into four or five parts, depending on the size of the class. Each group will visit all clinics. The group will be with you for 8 to 10 minutes. A different group will follow. This will take place four times each period.

1. Short introduction for one minute—a few words on the scope of the subject.

2. Avoid lecture method as much as possible. Encourage questions—permit interruptions by hand raising.

3. If questions are not forthcoming, introduce questions of your own. Let the audience participate as much as possible. Treat the students as young adults.

4. Bring into focus as much knowledge as they may have learned. Bring in Biology, Chemistry, Hygiene, etc.

5. Avoid gruesome details of dental procedure—play up the preventive phases. If there has been neglect, dental procedures are not punishment.

6. Stress the humane approach—the use of anesthesia.

7. This is a project of dentistry—you are representing the dental profession. Speak of generally accepted procedures. Do not discuss what you can do in your office.

8. Bring as much audio-visual material you may have on your subject. (Projectors and slides are welcomed. The students like to see slides on technical material.)

Publicity is a very important aspect of the program. Both the profession and the public should know about it. Months in advance, articles should appear in the various dental journals or bulletins telling dentists about the program. All possible methods are used to stimulate interest in

the profession in order to get active participation in the program for high school students.

In New York City, the Dental Information Bureau, through its director, Mr. John W. Milford, cooperated with the Oral Hygiene Committee to get newspaper publicity for the program. Four large New York City newspapers gave the project favorable coverage.

Those who participated in, or who observed, this program agree that the most effective way to reach the high school student is through the table clinic method. Through this method the dentist and dental hygienist are physically close to the students and the informal approach lends itself to greater interest and attention than is possible through the lecture method. Students in small groups feel free to ask questions and to discuss their own dental problems.

The use of the assembly program to reach a large number can be an effective aid to the high school program if used to prepare the student body for the table clinics that are held the following day. The factual material can be presented through such devices as carefully selected films, slides or film strips. The lecturer must be well prepared and must be able to hold the attention of a large group.

Each table clinic must have ample displays to serve as background material. They can be used to demonstrate the ideas presented by the clinicians.

COMMENT

An important conclusion arrived at after two years of experience is that a more effective program can be presented when boys and girls in a coeducational school are instructed separately. Two gymnasiums and two sets of table clinics should be used.

A successful program will bring great satisfaction to the dentists and dental hygienists involved, and also be gratifying to the educators working with the dental profession for the good of the student body. It should also result in improved dental health for the secondary student as well as an increased interest in dentistry as a career.

50 Westminster Road

Stimulus and Excitation • Happenings in life are not spontaneous manifestations of any internal vital principle. They are, on the contrary, the result of conflicts between living matter and external conditions. Life is manifested through the reciprocal connection between these two factors in the phenomena of sensitivity and movement which are considered in general to be of a high order and due to physicochemical actions.

This continuous relation between organic substance and its surrounding medium is a general feature of organic life, just as it is of the so-called animal life. Nutrition, like sensitivity or movement, shows in more or less complicated form this property of response to exitation. This faculty, which is an essential condition of all life phenomena in plants and animals, exists in its simplest form in the protoplasm. It is "irritability."

Whatever opinion one may hold regarding the choice of newer terms such as conscious perception, unconscious, unknowing, imperceptive or senseless sensitivity, it must be recognized that they stand for actual facts and measure up to a proper feeling of reality. All actions of the organism are acts provoked by external or internal, physiologic, normal, abnormal or artificial stimuli. It is of course correct that in such reaction there may be various stages, from "purely nutritional" or "trophic reaction" to "motor reaction" which is clearly appreciable, and finally the highest stage of "conscious reaction." *Claude Bernard, Reactions Common to Animals and Plants.*

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LON W. MORREY, D.D.S., EDITOR

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The Jenkins-Keogh bill: fair play and fair pay for all

There is a strong probability that Congress will consider some measure of income tax relief before adjournment. The dental profession and others among the self-employed are hopeful that Congress will not overlook a serious tax inequity which can be cured by including the Jenkins-Keogh plan within any prospective tax legislation. Passage of the Jenkins-Keogh bill (H.R. 9-10) will enable ten million or more Americans—including approximately one hundred thousand dentists—to establish retirement programs with the same low rate income tax privileges now available to employed persons.

Under the Jenkins-Keogh bill, any person who has substantial self-employment income will be permitted to put a small part of his earnings before taxes into a retirement fund. The maximum annual deductions permissible would be ten per cent of net earned income but not more than $5,000. The maximum deferable amount over a lifetime would be limited to $100,000.

Employee retirement pension plans have had an astounding growth in the United States since 1942 when the government supplemented the Social Security Act to encourage corporations and their employees to set up pension funds under preferential tax treatment. Although the Internal Revenue Code was substantially amended in 1954, Congress failed to extend to the self-employed a similar retirement plan tax benefit. Thus, the present income tax law still discriminates against the self-employed taxpayer in favor of the employee who is given a tax-free retirement plan by his employer. As a result some ten million owners of small businesses, physicians, dentists, attorneys, accountants, farmers and others experience an economic injustice.

Last year our neighbor on the north, faced with this same situation, enacted legislation somewhat similar to that proposed by Representatives Jenkins and Keogh. Two years ago Great Britain accomplished the same result. Surely the United States cannot afford to lag longer behind Canada and Great Britain in delaying action on this discriminatory situation.

As has been pointed out by the American Thrift Assembly—of which the American Dental Association is a member—passage of the Jenkins-Keogh bill will not only

correct an unjust provision in the Internal Revenue Act but it will increase national wealth and stem inflation by providing for long-term savings—something which is essential to preserve the American way of life. Furthermore, it will provide a stable growth of capital for industry, trade and construction, thereby stimulating productivity.

Now is the time for every member of the dental profession to urge his representative in Congress to support the Jenkins-Keogh bill—not only on behalf of dentists but on behalf of the ten million other self-employed persons who are entitled to the same tax privileges as those employed by others.

Arno Benedict Luckhardt: benefactor of dentistry

On March the fifteenth, nineteen hundred and fifty eight, the University of Chicago held a memorial service for Arno Benedict Luckhardt, M.D., one of its illustrious professors. Dr. Luckhardt died November 6, 1957, at age seventy-two, much too young for one who still had much to offer.

Professor Luckhardt is best known to the dental profession for his introduction of ethylene gas as an anesthetic and for his contribution as a charter member of the Council on Dental Therapeutics of the American Dental Association which was established in 1930. Prior to a generation ago, neither the public nor the profession had an authoritative source to which to turn for advice or information regarding the worth of dental therapeutic products. The establishment of the Council on Dental Therapeutics had much to do in correcting that situation, and Dr. Luckhardt had much to do with that correction. Prior to the advent of the Council, the field of dental therapeutics lay largely in commercial hands and some of those hands were none too clean. Thanks to the heroic measures advocated by Dr. Luckhardt and his associates, most of those hands, in time, were fairly well cleaned and so too were most of the products which they handled. In addition informational and advisory services were established for the protection of the public and the profession against the occasional manufacturer and vendor who have no scruples insofar as human life and health are concerned. These things Dr. Luckhardt and his fellows accomplished during the eighteen years he served as an active member of the Council on Dental Therapeutics, and for them, every member of the dental profession and countless members of the public are indebted. In recognition of his many valuable contributions to dentistry, the American Dental Association, in November 1957, elected him to honorary membership.

Dr. Luckhardt's services to dentistry were paralleled by his services to medicine and to other branches of the healing sciences. His entire professional life was spent at the University of Chicago. Beginning as an assistant in bacteriology in 1905-1909 he entered the department of physiology in 1909, in which department he attained the rank of professor in 1923 and the designation of William Beaumont Distinguished Service Professor in 1947. As a teacher and an investigator he published many papers on the history of physiology and of medicine. Equally outstanding were his investiga-

tions of the physiology of gastric secretion, gastrointestinal motility, the visceral sensory nervous system and the function of the parathyroid glands.

A summation of Dr. Luckhardt's character, life and contributions can be expressed no better than in the words spoken at his memorial service:

Scientist, scholar and teacher, Arno B. Luckhardt made an outstanding contribution to his university, his profession, his fellow scientists, and his pupils. Physiology, medicine, surgery, dentistry, and anesthesiology have been enriched by his contributions to human welfare. But the man was greater than the sum of his parts; his memory will live long with the many who admired, respected, and loved him and his works.

Health education: a guide to good dental health

Out of the Ozarks has come one of the most practical guides for dental health education developed by a state in many a year. Those responsible for it are to be congratulated on the quality of its contents and the attractiveness of its presentation. Developed by the Arkansas State Dental Association in cooperation with the division of dental hygiene, Arkansas State Board of Health, the spiralbound, tersely worded text presents the official policy of the Arkansas State Dental Association with respect to preventive dentistry and dental health education. Additionally it presents the objectives of state-wide programs and the technics designed to reach those objectives. Arkansas' approach to its problem is "basically dedicated to one goal—that of effecting a change . . . in the minds of our growing children . . . which will bring about a marked improvement in oral hygiene habits." Inasmuch as such changes cannot be brought about by dentists alone, the guide outlines the duties and responsibilities of others who are expected to cooperate: the dental health consultant, the school health coordinator and the school health council. It also spells out in few words the technics to be used in teaching dental health, making dental inspections, and providing dental care for the indigent.

Since before the turn of the twentieth century, the American Dental Association has taken a leading role in promoting preventive dentistry and dental health education. Down the years the Association has prided itself on the quality and amount of dental health educational material which it has developed and disseminated across the country. The Bureau of Dental Health Education of the Association is constantly developing new material and revising old. Necessarily such material must be of a general nature, applicable to all sections of the country. For that reason it is desirable that state dental associations, and in many instances local dental societies, develop dental educational material to meet their own specific situations and problems. Although many states have done so, the palm, in this instance, goes to Arkansas because of the concreteness of its program and the conciseness with which it is presented.

It is recognized that a dental health guide book designed to meet the needs of Arkansas children might not be wholly applicable in the other forty-seven states. Other states, however, might well take a leaf out of Arkansas' book and build a better book of their own.

International Correspondence

NEWS FROM GREAT BRITAIN

On December 31, 1957, the income of the British Dental Association totaled £63,125, collected from 10,806 members. In addition, there were 159 life and honorary members and 172 members who had not paid, bringing the total membership to 11,137. During 1957, there were 365 new members and 288 members were lost because of death or resignation.

With the death of Prof. James Brash, one of the foremost British anatomists, the association has lost the honorary membership of a very worthy scientist. His papers and lectures on the etiology of orthodontic problems probably have never been equaled. His paper, "Growth of the Alveolar Bone," published over 30 years ago, was described as being "a permanent and final contribution to the knowledge of the growth of the jaws and especially the growth and eruption of the teeth."

Treatment of Children During School Hours • The General Dental Services Committee, under the chairmanship of R. G. Swiss, considered an interesting complaint from Scotland that in some areas head teachers were making difficulties about releasing children for dental treatment during school hours.

The Committee considered whether a further approach should be made to the government departments concerned, asking them to advise head teachers that children should be released from school as necessary to see their dentists. It was recalled, however, that the ministries had already made it clear that this was a matter for local discretion and that constitutionally they were not in a position to give instructions to local education authorities. It seemed to the General Dental Services Committee that this problem, therefore, must continue to be attacked by local action, and many members who were present at the meeting spoke of the success that their sections or local dental committees had achieved by making direct approach to head teachers or to directors of education.

There was also general agreement of the Committee that dentists themselves must be prepared to make some concessions in the matter. For example, they should be ready to arrange appointments so that a child will not miss the same lesson on each occasion, and they should take into account the disadvantage which a child who is working for an examination may suffer because of repeated absence during school hours.

BRITISH DENTAL JOURNAL

There is a section in the *British Dental Journal*, namely "Letters to the Editor," which in many ways is quite unique in its scope and interest, and in my opinion its extent is not duplicated in any other dental journal. For example, the March 4 issue contained letters covering the following subjects: the British Society for the Study of Prosthetic Dentistry, high-speed cutting, high-speed handpieces, the antiquity of dental caries, fluoridation of water supplies, laboratory testing of dental caries preventives, claims of therapeutic dentifrices, soil and health, reasons for the plight of the school dental service, scale of losses, perils of discussion with press reporters, the interim increase (dealing with remuneration to National Health Service dentists) and higher dental degrees.

This list gives a very fair cross section of the various subjects which are interesting the dental profession in the United Kingdom at present.

GENERAL DENTAL PRACTITIONERS' ASSOCIATION

The General Dental Practitioners' Association is a small organization consisting of 1,100 dentists in the National Health Service who have broken away from the British Dental Association and profess to act in the interests of the dental profession in the United Kingdom as a defense against the shortcomings of the British Dental Association.

This group is led by K. Malik, who together with some of his colleagues presented verbal evidence to the Royal Commission on Doctors' and Dentists' Remuneration. Dr. Malik was the chief spokesman. Many statements were made by the delegation and the hearing ended with a warning by the chairman to Dr. Malik that he had made a number of wild statements that doubtless would be criticized by other bodies. This has become fact, for in the March 4 issue of the *British Dental Journal*

an editorial entitled "Evidence by the G.D.P.A." does vigorously criticize the General Dental Practitioners' Association.

DENTAL HYGIENISTS

It is only quite recently in the United Kingdom that a general dental practitioner has been permitted to employ a dental hygienist in his practice. If he does so he must take care to comply with the following conditions:

1. The hygienist must have his or her name entered in the roll kept by the General Dental Council. A dentist should satisfy himself thoroughly on this point before he employs a hygienist.

2. So far as dental advice and treatment are concerned a hygienist may carry out only the following work: cleaning and polishing of the teeth, scaling of the teeth, the application to the teeth of sodium or stannous fluoride and giving advice to patients on matters related to oral hygiene.

Scaling is defined in the regulations as "the removal of tartar, deposits, accretions and stains from those parts of the surfaces of the teeth which are exposed or which are directly beneath the free margins of the gums, including the application of medicaments appropriate thereto."

3. Before the hygienist gives advice or treatment as specified, the dentist must first examine the patient and must indicate the course of treatment which the hygienist is to provide.

4. While this treatment or advice is being given by a dental hygienist, the hygienist must work only under the direct personal supervision of a dentist who must be on the premises at the time the work is being carried out.

The supply of hygienists will be very small for some time to come. Most applicants for enrollment with the General Dental Council must first undergo a course of training lasting at least nine months and then must pass the prescribed examination. The Ministry of Health is in the process of arranging training courses, but none has yet been started.

NATIONAL HEALTH SERVICE

While visiting Australia in 1957, Prof. Frank Wilkinson, dean and director of studies at the Institute of Dental Surgery, Eastman Dental Hospital, London, gave a lecture entitled "The National Dental Service of the United Kingdom—A Review of its Achievements" to the Australian Dental Association. This lecture was published in the December 1957 issue of the *Australian Dental Journal*, and it is of great interest. Part of the conclusion of the lecture is as follows:

"Finally, it is important to learn from the difficulties and failures of the Dental Service in the United Kingdom, particularly, the danger that such a service as dental health can become a political issue, and that the establishment of some form of national dental service is inevitable, gradual though that inevitability may be. The development of such a service should be taken, as far as possible, out of the hands of politicians.

"Life and human progress depend upon our capacity to react and reach a state of equilibrium with our environment. The more stable our environment has been and the older we get, the more we tend to lose that capacity.

"We live in a rapidly changing world and survival, professional and individual, depends upon our capacity to adapt ourselves to our surroundings. When one is suddenly overwhelmed by such radical changes as have taken place in England, the mental processes involved are somewhat painful. Undoubtedly the future pattern of dentistry depends very largely upon the way our schools respond to the new demands now being made upon them."

ITEMS OF INTEREST

The British Medical Association and the Pharmaceutical Press have published the third edition of the *Dental Practitioners' Formulary*, which is based on the *British National Formulary* and is intended as a guide to prescribing for dental practitioners in the National Health Service.

The many friends of Air Commodore H. Keggin will wish to congratulate him on his appointment as deputy director of the dental services, Royal Air Force.

The American Dental Society of London held its annual clinical meeting in March at the Dental School, London Hospital Medical College, and a very fine program of chairside and table demonstrations and films was presented.

At the dinner in the evening, presided over by Douglas Derrick, the guest speaker was E. H. Leather, a well-known member of Parliament.

The British Society of Periodontology had a most successful March meeting at which two short papers and a film were presented. Prof. E. D. Framer of Liverpool is the president of the Society.

G. H. Leatherman,
D.M.D., F.D.S., R.C.S., F.A.C.D.

NEWS FROM AUSTRALIA

Despite strong opposition from the Australian Dental Association and the advice of professional and university authorities, the Tasmanian Parliament in November 1957 passed an amendment to the Dentists' Act giving dental technicians who are registered in that state the right of direct contractural relationship with the public.

The bill, which probably will be regarded as one of the most retrogressive pieces of legislation in the history of the dental profession, contains a number of good features, but there are two sections which have been condemned throughout Australia.

The first concerns the provision of a special examination for certain illegal practitioners with a view to their registration as dentists, and the second grants to dental mechanics the right of undertaking repairs and of constructing dentures through direct contractual relationship with the public. This new legislation in Tasmania is a menace to public health since it will permit unskilled and untrained personnel to practice dentistry. It is, in effect, putting back the clock to the middle of the nineteenth century.

The administration of the Tasmanian Dentists' Act is vested in the State Dental Board, a body which has been severely restricted by lack of funds. The penalty for infringement of the Dentists' Act was never sufficient to act as a deterrent, and as a result illegal practice flourished, particularly during the years immediately after World War II, when there was a general shortage of dentists throughout Australia.

The passage of the bill through both Houses of Parliament was marked by long and acrimonious debate. The public health aspect was stressed repeatedly, and it was pointed out that, in granting these privileges to those who had practiced dentistry illegally, Parliament was simply condoning breaches of the law. Despite the strongest opposition, the measure passed all stages and Royal Assent was obtained.

Under the provisions of the act "a dental mechanic may on his own account and in direct relationship with the public, undertake, take impressions for, supply or carry out the mechanical construction, adjustment and fitting of artificial dentures for a human subject on a certificate of a dentist that the subject's mouth is in a fit state to receive artificial dentures." How this section can be administered is not clear, but, as law-abiding citizens and despite rooted objection to the clause, members of the profession must cooperate.

A dental mechanics' registration board has been set up under this new measure, part of its functions being to establish a course of training for dental mechanics and to conduct examinations in order to ensure that the requisite standard is reached. The course must include clinical and theoretical aspects of denture construction, but, as there is no precedent to follow and there is neither a dental school nor hospital in Tasmania, it is very difficult to see how this can be effected.

As dental mechanics are now in open competition with members of the dental profession, they must keep records, submit tax returns and maintain premises of a reasonable standard. There can be little doubt that the dental profession, with its skill and training, will soon convince the public of its vast superiority in the field of dental prosthesis, therefore making the mechanics' position even less secure than prior to the passage of the bill.

AUSTRALIAN DENTAL CONGRESS

The organization of the 15th Australian Dental Congress is now underway, and a most successful meeting is anticipated. The Congress is to be held in Adelaide, South Australia, February 23-27, 1959.

Main lectures of the scientific program have been reduced to a minimum, and the balance of the program will consist of lecturettes, table demonstrations, televised clinics, films and silent exhibits.

An invitation to act as the principal lecturer at the Congress has been accepted by Bertram Downs of Colorado Springs, Colo., and Dr. Edgar Thompson, director of the Fairfax Institute of Pathology of the Royal Prince Alfred Hospital, Sydney, has been invited to address the Congress on antibiotics. Prof. J. P. Walsh of the University of Otago, New Zealand, has accepted an invitation to attend the Congress as a guest lecturer.

WHO DENTAL HEALTH SEMINAR

A proposal to hold a dental health seminar in Adelaide, South Australia, in February 1959 immediately prior to the 15th Australian Dental Congress received strong support from the headquarters of the World Health Organization and from the regional director of the Western Pacific area in Manila. The pro-

visional budget for 1959, which includes an allocation of $32,445 as a contribution to the estimated cost of the seminar, has been approved by the regional committee. The final decision rests with the World Health Assembly, which is to meet in the United States in May of this year.

The proposed seminar will be of ten days' duration. In addition to the director and four consultants, 38 members from the Western Pacific, South East Asia and Eastern Mediterranean areas will participate in the seminar.

During an inspection tour of countries in the South East Asia and Western Pacific areas, Carl L. Sebelius, dental adviser to WHO headquarters, visited Australia in November 1957 to inspect the site for the seminar and to discuss its organization generally. While in Australia, Dr. Sebelius conferred with officers of the Commonwealth Department of Health, the Australian Dental Association and the 15th Australian Dental Congress.

HARRIS APPOINTED CONSULTANT TO THAILAND

Robert Harris, head of the department of preventive dentistry at the United Dental Hospital, Sydney, and editor of the *Australian Dental Journal*, accepted an invitation from the World Health Organization to act as a consultant in the field of dental education and dental services to the government of Thailand. He arrived in Bangkok early last November to take up the appointment for a period of three months.

PHARMACEUTICAL BENEFITS

For some years the Australian Dental Association has pressed for the widening of the Commonwealth government's pharmaceutical benefits scheme to permit members of the dental profession to prescribe certain drugs, for free issue, on the same basis as registered physicians.

Last August, when acknowledging the latest representation made by the Australian Dental Association on behalf of members of the profession, the Minister for Health advised that the government was not prepared to sponsor an extension of the present scheme along the lines proposed by the association, as its policy was to confine pharmaceutical benefits to a basic list of life-saving and disease-preventing drugs prescribed by physicians.

FULBRIGHT SCHOLAR

The Australian Dental Association and the Dental School of the University of Sydney, in conjunction with the Fulbright program, arranged for Kenneth Wessels of the University of Iowa to visit Australia during the 1957 academic year.

Dr. Wessels, who is head of the department of pedodontics and preventive dentistry at the University of Iowa, was awarded a fellowship under the Fulbright Act, making him the first dental graduate to visit Australia under the program.

During his stay, Dr. Wessels visited each of the dental schools in Australia and spent some time in Tasmania. Individual state branches of the Australian Dental Association took the opportunity offered by these visits to arrange for Dr. Wessels to address their members and to meet civic, political and academic leaders in Australia.

PRESIDENT'S OVERSEAS TOUR

During an overseas tour in the last part of 1957, the president of the Australian Dental Association, Kenneth Adamson, renewed many friendships in London and America, and, as official representative of the association, he attended the annual conference of the British Dental Association in Newcastle upon Tyne.

In July, along with Harold Hillenbrand, secretary of the American Dental Association, Dr. Adamson was formally admitted to fellowship in the faculty of dental surgery of the Royal College of Surgeons by Sir James Patterson Ross, president of the college. It was a great pleasure to Dr. Adamson to share this memorable occasion with Dr. Hillenbrand, who has been his close personal friend for many years.

Dr. Adamson attended the International Dental Congress in Rome and spent some weeks in America before returning home in November.

During the president's absence from Australia, the affairs of the association were administered by the vice-president, A. Gordon Rowell.

Margaret Hjorth.

Association Affairs

NIDR BUILDING MONEY APPROPRIATED BY HOUSE

The House of Representatives on March 27 passed a bill which included a $3,700,000 appropriation for a building for the National Institute for Dental Research and an additional $250,000 for dental health and research activities of the Public Health Service. These allocations were contained in the appropriations bill for the Departments of Labor and of Health, Education and Welfare.

The bill was under consideration by a Senate committee headed by Senator Lister Hill (D., Ala.) as THE JOURNAL went to press. The Council on Legislation expected to offer testimony in the Senate hearings urging Senate approval of an appropriation for the building and also an additional $750,000 for the grants program of the Dental Institute.

The response to the *Information Bulletin* asking Association members to write their congressmen and key congressional leaders in support of the appropriation for the NIDR building has been overwhelming said Bernard J. Conway, secretary of the Association's Council on Legislation.

Dental Schools • Representatives of the American Dental Association, the American Association of Dental Schools and the Association of American Medical Colleges were scheduled to present testimony April 22 and 23 in a panel discussion before the Subcommittee on Health and Science of the House Committee on Interstate and Foreign Commerce, which was to consider proposals for federal grants-in-aid to dental and medical schools for teaching and research facilities.

Three bills are under consideration. In general, they would authorize about $8,000,000 a year for five years for dental school needs.

Francis Herz, member of the Council on Legislation, and Dr. Shailer Peterson, secretary of the Council on Dental Education, were to be among the Association's representatives on the panel. Harry Lyons and Clemens Rault were scheduled to represent the American Association of Dental Schools at the subcommittee hearings.

Tax Regulations • The right of dentists to deduct as business expenses the cost, including travel, for taking refresher courses in dentistry was confirmed by new regulations issued by the Internal Revenue Service in early April. The rules also govern deductions for travel expense incurred in connection with attendance at certain professional and scientific meetings.

The regulations are retroactive for three years in regard to refresher courses. The deduction is not applicable for postgraduate work leading toward entrance into a specialty or certification as a specialist.

Military Pay Increases • The House of Representatives approved on March 25 a measure which would raise the pay scale for members of the Armed Forces. The bill would mean a substantial increase for persons in the higher ranks.

The "career incentive" program, which provides special pay for dental and medical officers, was not affected by the bill approved by the House. The proposal is now under consideration by the Senate Armed Services Committee.

Unemployment Tax • The House Ways and Means Committee was expected to take action in late April on a proposal to extend benefits and coverage under the Unemployment Compensation Act. Of special interest to dentists is a proposal that would make the payment of federal unemployment tax mandatory for employers of one or more persons. The existing law limits the tax payment to employers of four or more persons.

RELIEF FUND REACHES $119,634 AS DRIVE NEARS END

Contributions in the 1957-1958 Relief Fund drive totaled $119,634.28 on April 14, the last date for which a total was available. The current campaign closes June 30, according to Louis M. Cruttenden, Association assistant secretary.

HOLLISTER HEADS DEPARTMENT OF ADVERTISING, EXHIBITS

The creation of a new Department of Advertising and Exhibits at the Central Office of the Association was announced April 15 by Harold Hillenbrand, Association secretary. The new department has been established because of the increased activities of the business office which have accompanied the growth of the Association. John J. Hollister, who has been business manager of the Association since 1943, was appointed director of the department.

John Hollister

John Rush

John E. Rush was named to succeed Mr. Hollister in the position of business manager. Mr. Rush has been assistant business manager since 1956.

Peter C. Goulding, secretary of the Council on Scientific Session, has been appointed to serve also as secretary of the

Peter Goulding

Council on International Relations and as secretary of a recently created staff committee on the centennial celebration of the Association in 1959. James Bonk of the Bureau of Public Information will serve as assistant secretary of the staff committee.

Hal Christensen, assistant secretary of the Council on Legislation, was appointed to serve additionally as assistant secretary of the Judicial Council.

As director of the new department, Mr. Hollister will be able to give his efforts full time to advertising and exhibits, fields in which he has been recognized nationally. Mr. Hollister was recently elected to a second term as secre-

tary of the Professional Convention Management Association, and last year he served as chairman of the Advisory Conference on Medical Exhibits, in which exhibitors and exhibit managers in the health fields participated.

Before joining the staff of the Association, Mr. Rush was personnel manager of the Bankers Life and Casualty Company of Chicago and, during World War II, he was management director of the Mid West office of the War Manpower Commission. Mr. Rush has served also in a management position with the Wage Stabilization Board.

Wayne E. Burmeister will continue as assistant business manager.

HOUSING BUREAU OPENS MAY 1 FOR DALLAS ANNUAL SESSION

The opening of the Housing Bureau for the American Dental Association's 99th annual session, which is to be held in Dallas November 10-13, has been announced by P. Earle Williams, chairman of the General Committee on Local Arrangements.

All reservations must be made through the A.D.A. Housing Bureau, which is located at 1101 Commerce St., Dallas 2, Texas.

Accommodations have been pledged by some 20 hotels and a similar number of motels in Dallas. A map of downtown Dallas showing the locations of the hotels and an official application form appears on pages A-2 and A-3 of this issue of THE JOURNAL.

The scientific program will be presented at the Dallas Memorial Auditorium.

A.D.A. WASHINGTON OFFICE MOVES TO NEW ADDRESS

The Washington office of the American Dental Association will move about May 1 to larger quarters at 806 Connecticut Ave., N.W.

The removal of the office from its location on I Street in Washington, D. C., was authorized by the Board of Trustees at its meeting in March.

C. Willard Camalier, assistant secretary of the Association, is in charge of the Washington Office. According to Dr. Camalier, the building in which the office will be located is near Lafayette Square and the White House. Several hotels, including the Statler, are in the vicinity.

PROHIBITION ON MORE FAMILY DENTAL CLINICS ISSUED

The establishment of any more family dental clinics at Air Force bases or other military installations was prohibited, pending further study, by order of the Secretary of Defense in late March.

Four such dental clinics are to remain in operation. These are the clinics at Lowry, Scott, Chanute and Keesler Air Force bases, according to Herbert C. Lassiter, secretary of the Council on Federal Dental Services.

The action was taken because of the opposition of the American Dental Association as stated in a resolution of the House of Delegates. The Association's policy was reiterated in a statement adopted by the Board of Trustees at its March meeting.

WRITING PRINCIPLES TOLD AT JOURNALISM CONFERENCE

A two day conference on dental journalism, co-sponsored by the Council on Journalism of the American Dental Association and the American Association of Dental Editors, was held March 23 and 24 at the Central Office. The Council on Journalism met on March 22, preceding the conference.

The journalism conference was focused mainly on the content of publications and factors influencing readability of articles. Representatives of Medill School of

Journalism of Northwestern University participated in a symposium on "How to Write" on the first day of the conference. Representatives from the American Library Association, the American Hospital Association and the National Society for Crippled Children and Adults also spoke to the dental editors.

Staff members of the American Dental Association who spoke included Lon W. Morrey, editor; Dr. George B. Denton, research consultant; Mr. N. C. Hudson, assistant editor; and Miss Barbara Dunsmore, manuscript editor.

The Council on Journalism went on record as regretting that there is no dental journal for the Rocky Mountain area which includes Idaho, Montana, Utah and Wyoming, and as favoring the establishment of a regional journal to serve these states. Approval in principle was also given to a sample kit for dental editors. The kit would include, when completed, copies of informative material. The Council also discussed the preparation of an exhibit of dental periodicals for display at the 1958 annual session in Dallas, according to J. C. A. Harding, Council chairman.

1959 APPOINTMENT BOOK TO BE AVAILABLE MAY 15

The 1959 American Dental Association appointment book will be available from the Order Department at the Central Office May 15.

The 1959 book is improved over the 1958 appointment book in several respects. Lines are lighter, enabling the user to enter appointments more easily. The half hours are shown as well as the hours, and the evening hours to 9:00 P.M. are also shown.

The appointment book contains calendars for 1958, 1959 and 1960 and a list of national, state and territorial holidays.

The book is case bound in simulated leather. The price is $3 postpaid to any destination in the United States.

BUREAU REVISES MATERIALS FOR TEACHERS, TEEN-AGERS

Attractive Teeth for Teen-agers and *Dental Health Facts for Teachers* have been revised, according to Perry J. Sandell, director of the Bureau of Dental Health Education.

Sample copies of the two publications are available from the Bureau at the Central Office.

COUNCIL MEMBERS TO APPEAR ON INSTITUTE PROGRAM

H. Cline Fixott, Jr., chairman of the Council on Hospital Dental Service, American Dental Association, and Morgan Allison, John Looby, Ormonde McCormack, and Phillip Sheridan, members of the Council, will participate on the program of the Second Institute on Hospital Dentistry, to be held at the Edgewater Beach Hotel, Chicago, June 2-5.

The Institute is sponsored jointly by the American Dental Association, the American Hospital Association and the American Medical Association.

On the opening day of the Institute, greetings will be given by Harold Hillenbrand, secretary of the American Dental Association; Mr. John Hatfield, hospital administrator at Passavant Hospital, Chicago, and treasurer of the American Hospital Association; and F. J. L. Blasingame, M.D., general manager of the American Medical Association. In addition several chiefs of hospital dental services, hospital administrators and hospital trustees will be among the speakers. Gerard J. Casey, secretary of the A.D.A. Council; Fred A. Henny, editor of JOURNAL OF ORAL SURGERY, and Frank B. Hower, secretary-treasurer of the American Society of Oral Surgeons, will also appear on the program.

Reservation blanks may be obtained from the Institute office, American Hospital Association, 18 E. Division St., Chicago. The attendance fee is $40 a person.

LOYOLA HONORS FIVE ALUMNI AT DIAMOND JUBILEE PROGRAM

Five awards were given to outstanding alumni during the 75th anniversary homecoming program of the Chicago College of Dental Surgery of Loyola University, held April 14-16 at the school.

Harold Hillenbrand, secretary of the American Dental Asociation, was presented the annual alumni award at the homecoming banquet held at the Congress hotel April 16.

Lon W. Morrey, editor, American Dental Association, received the Charles N. Johnson Award for outstanding contributions in the fields of dental literature and journalism. The Truman W. Brophy Award was presented to Robert W. McNulty, dean of the University of Southern California School of Dentistry, for outstanding contributions in the fields of dental education and administration, and Colonel Leland G. Meder, assistant chief, Dental Division, Office of the Surgeon General, U. S. Army, was the recipient of the William H. G. Logan Award for outstanding contributions to the Army Dental Corps.

Frank M. Amaturo, outgoing president of the Loyola Dental Alumni Association, was given the Past Presidents Testimonial award.

The three day scientific program included essays, table clinics, commercial exhibits, a television demonstration and a day of student essays and table clinics.

Frank A. Farrell was general homecoming chairman.

REPRINTS OF ARTICLE ON RADIATION AVAILABLE

Reprints of "The Truth About the X-Ray Scare," a popular article which appeared in the February 22 issue of *This Week Magazine,* are available from the Bureau of Public Information of the Association.

The article contains a statement by Harry Lyons, dean of the School of Dentistry of the Medical College of Virginia and immediate past-president of the American Dental Association. The Council on Dental Research has recommended the article for distribution to patients.

Permission to make the reprints was obtained from the United Newspapers Magazine Corporation and the author of the article, A. E. Hotchner.

Sample copies may be obtained from the Bureau at the Central Office. The following charges will be made for quantity orders: 100 copies for $1; 500 for $3; and 1,000 for $5.

ALSTADT TO ATTEND FOREIGN AFFAIRS CONFERENCE

William R. Alstadt, president of the American Dental Association, will represent the Association at the Spring Conference on Foreign Affairs for National Non-Government Organizations, which is to be held May 22 and 23 at the Department of State in Washington, D. C.

The invitation was issued by Andrew H. Berding, assistant secretary of state, in behalf of Secretary Dulles.

ASSOCIATIONS FORM COUNCIL ON HEALTH CARE FOR AGED

In order to work toward the solution of some of the health problems of the aged, the American Dental Association, American Hospital Association, American Medical Association and American Nursing Home Association have formed the Joint Council to Improve the Health Care of the Aged.

The objectives of the Joint Council are as follows: (1) to identify and analyze the health needs of the aged; (2) to appraise available health resources for the aged; and (3) to develop programs to foster the best possible health care for the aged regardless of their economic status.

The Joint Council, the formation of which has been under consideration for

some time, is made up of three representatives of each association. The representatives of the American Dental Association are William R. Alstadt, president; Harold Hillenbrand, secretary; and Mr. Bernard J. Conway, secretary of the Council on Legislation.

Results of the studies are to be pooled and programs are to be developed, with the Joint Council acting as the coordinating agency. The Joint Council plans to work with health insurance groups in the development of insurance programs to meet the needs of the aged. The stimulation of health programs at the state and community levels is another goal of the group, with the ultimate goal being to make adequate health care available to the aged at reasonable costs.

ASSOCIATION ISSUES BOOK ON NOMENCLATURE BY DENTON

Vocabulary of Dentistry and Oral Science, a book which should help the dentist solve many problems of terminology, has been published by the American Dental Association. George B. Denton, Ph.D., Association research consultant and former professor at Northwestern University Dental School, is the author.

The book is the result of eight years of experience in the exploration of dental nomenclature, including three conferences of which Dr. Denton had charge.

Designed particularly for the use of dental students and teachers, the book explains the way scientific words are composed, and terms in the dental vocabulary are used to exemplify the principles given. A glossary of selected terms and their synonyms, with critical discussions, is included.

The book of over 200 pages is cloth bound in black with gold lettering and is priced at $4 a copy. Orders should be addressed to the Order Department of the Association, 222 E. Superior St., Chicago 11.

MAY MEETING PLANNED BY COUNCIL ON EDUCATION

The Council on Dental Education will consider the accreditation of schools of dentistry and dental hygiene at its meeting May 22-24 at the Central Office.

The proposed bylaws for the National Board for Certification of dental laboratory technicians and questions relating to dental specialties will also be discussed, according to Dr. Shailer Peterson, secretary of the Council.

Dental Societies

FLORIDA SOCIETY TO HOLD 75TH ANNIVERSARY MEETING

The Florida State Dental Society will hold its 75th anniversary meeting at the Fontainebleau hotel in Miami Beach May 18-21.

Speakers on the opening day will include Bryant S. Carroll of Jacksonville, president of the Florida society, and Arthur W. Kellner of Hollywood, Fla., first vice-president of the American Dental Association.

Film clinics, essays and table clinics will complete the scientific program. A banquet with dancing following will be held at the Eden Roc hotel on May 20.

WISCONSIN FOUNDATION GIVES CHECKS FOR PROJECTS

The Wisconsin Dental Association Foundation has presented the first checks for two of its projects, the student loan project and the dental research project.

Checks for $300 and $250 were presented to O. M. Dresen, dean of Marquette University School of Dentistry, for student loans. The loans are available for tuition and fees to junior and senior dental students who are residents of Wisconsin.

A research grant of $500 was awarded

to R. V. Brown, associate professor and director of the department of pedodontics at Marquette University, and Gunnar Ryge, assistant professor and director of the department of dental materials. The grant is for a study on the effect of particle size of dental amalgam alloys of the nonzinc and conventional types.

Requests for loans and grants are individually evaluated by the planning committee of the Foundation.

MAINE SOCIETY'S RELIEF FUND RECEIVES $55,000 BEQUEST

The relief fund of the Maine Dental Society received a bequest of $55,917. The money was willed to the relief fund of the society by Mrs. Jennie C. Redlon of Waldoboro, Maine, the widow of the late Francis W. Redlon who was a member of the dental society.

The gift is believed to be one of the largest gifts ever willed to a state dental society.

Parker Mann of Auburn, Maine, is president of the society, and Henry Grant of Portland is president-elect and chairman of the relief fund committee.

JOURNAL ISSUED BY MARYLAND ASSOCIATION

The first issue of the *Journal of the Maryland State Dental Association* appeared in April. The new journal, which is to be published twice a year in April and September, is carefully planned, well printed and attractively designed.

Volume one, number one of the journal was issued in conjunction with the Maryland association's 75th anniversary celebration this year. The program of the association's meeting, which is to be held May 4-7 at the Lord Baltimore hotel in Baltimore, is included in the first issue, which contains 71 pages of editorial material.

The Maryland State Dental Association is the 38th constituent society to publish a journal.

SOCIETY TO HONOR HOFFMAN ON 50TH YEAR OF SERVICE

The Nassau County, N. Y., Dental Society will sponsor a testimonial dinner for Samuel G. Hoffman of Hempstead, N. Y., in recognition of his 50th year in

Maine Dental Society officers accepting $55,917 bequest to society's relief fund are (l. to r.) Frank Gilley, vice-president and chairman of executive committee; Parker Mann, president; Stanley Gower, secretary; Henry Grant, president-elect and chairman of the relief fund committee; and Edward Peaslee, treasurer

the practice of dentistry. The dinner will be given May 25 at the Garden City hotel, and the subscription will be $10.

Dr. Hoffman was one of the founders and was the first president of the Tenth District Dental Society of the State of New York, and he is a past-president of the Nassau County Dental Society.

Further information may be obtained from Edward A. Lusterman, 165 N. Village Ave., Rockville Centre, N. Y., or Arthur A. Selzer, 294 W. Merrick Rd., Freeport, N. Y.

GREATER NEW YORK MEETING SET FOR DECEMBER 8-12

The 34th Greater New York Dental Meeting will be held at the Hotel Statler in New York December 8-12. The annual event is sponsored by the First and Second District Dental Societies of the State of New York.

The meeting will feature registered clinics conducted by well-known clinicians. These clinics will be postgraduate in scope. Projected, television and table clinics will also be given, in addition to topic discussions, essays and symposiums. Also, commercial and scientific exhibits will be displayed.

Adolph G. Wagner is general chairman for the event.

Further information may be obtained from Mrs. Mabel Purdy, executive secretary, Room 106A, Hotel Statler, New York 1.

Public Health

VA RELEASES STATISTICS ON DENTAL TREATMENTS

Statistics on the number of dental treatments given during the calendar year 1957 have been released by the Veterans Administration.

According to J. E. Fauber, assistant chief medical director for dentistry, 56,917 dental outpatient examinations were made during 1957, with 61,313 courses of treatment having been completed.

During the same period there were 510,207 inpatient admissions, 493,243 to hospitals and 16,964 to domiciliaries.

Of the hospital admissions, 408,844 (82.9 per cent) were seen by a dentist and 242,517 (49.2 per cent) received complete dental examinations. In addition, 39,033 received subsequent dental examinations. Of those examined, 150,859 (53.6 per cent) were prescribed some form of dental treatment, and 121,868 (80.8 per cent) received the prescribed treatment.

Of the 16,964 domiciliary admissions, 13,709 (80.8 per cent) were given complete dental examinations. Of those examined, 13,121 (95.7 per cent) were prescribed treatment, and 11,272 (85.9 per cent) received the prescribed treatment.

NEW YORK BOARD ENACTS RADIATION PROVISIONS

In March the New York City Board of Health instituted a program for radiation protection and enacted regulations providing for the registration of sources of radiation, including x-ray machines and radioactive isotopes.

Registration forms are to be sent to dentists, physicians and other users of such sources of radiation. There will be a registration fee charged.

The program will also include the making of radiation protection surveys if there is a suggestion that equipment is not functioning properly. The Board also plans to consult with manufacturers to encourage the incorporation of safeguards in new machines and plans to sponsor

seminars in cooperation with dental and medical groups to disseminate current information.

Twenty-four hour emergency assistance for any user of a source of radiation will also be provided through the program.

PERIODONTOLOGY GROUP ENDORSES FLUORIDATION

The Southern Academy of Periodontology unanimously passed a resolution endorsing fluoridation at their 38th annual meeting in New Orleans recently.

Last year in a controversy over fluoridation of New Orleans' water supply, a committee of several physicians reported to city authorities that the use of fluoride might cause increased periodontal disease. No dentists served on the committee.

The resolution was introduced to the Academy by L. G. Roeling, chairman of the fluoridation committee of the New Orleans Dental Association.

DENTAL CLINIC FOR RETARDED CHILDREN OPENS

A special dental clinic for mentally retarded children opened in Providence, R. I., in early March.

The clinic operates in conjunction with the Joseph Samuels Dental Clinic, which is a unit of Rhode Island Hospital. The special clinic, which is partially supported by federal funds, is specially equipped, and personnel for pediatric examinations and the administration of anesthesia are provided through the hospital.

The Parents' Council for Retarded Children of Rhode Island, after receiving many inquiries about dental treatment for mentally retarded children, contacted Michael Messore, director of the Samuels Clinic, about special dental services. The plan also received the support of the Rhode Island State Dental Society.

The special clinic is under the supervision of Gennaro Savastano, assistant director of the Samuels Clinic.

PUBLIC HEALTH DENTISTRY COURSE OFFERED IN BRAZIL

The School of Hygiene and Public Health of the University of São Paulo, Brazil, inaugurated a course in public health for dentists in February. The course is international in character and is aimed at preparing dentists to be administrators of dental public health programs in the Latin American republics.

Sixteen dentists representing eight countries are presently enrolled in the course. Eight of the students have been awarded fellowships from WHO.

Several agencies have assisted in the development of the program. The World Health Organization provides advisory services, fellowships and teaching materials. The Kellogg Foundation provides financial assistance, teaching equipment and supplies, and the Special Public Health Service—a bilateral Point IV program in Brazil—will participate principally in the training of the students.

EXAMINATIONS SET FOR JOBS IN PUBLIC HEALTH

The U. S. Civil Service Commission has announced that examinations will be held for public health advisers and public health analysts to work in the Public Health Service and the Children's Bureau.

The work of the public health adviser is concerned with assistance programs to states, communities and groups for public health services and facilities. The analyst is responsible for carrying out studies on health needs and current and future health problems.

Further information may be obtained from the Bureau of Departmental Relations of the U. S. Civil Service Commission, Washington 25, D. C.

DENTAL HEALTH COURSE FOR TEACHERS TO BE GIVEN

A course in dental health education for elementary school teachers, believed to be the first course for teachers dealing exclusively with dental health, will be given June 23 through August 2 and August 4 through 30 during the summer session by the University of Southern California School of Dentistry and the Southern California State Dental Association.

The dental association plans to award 15 scholarships at $100 each for the course.

Robert W. McNulty, dean of the school; Lloyd F. Richards, dental director of California; Charles T. Smith, chairman of the council on dental health of the dental association; and Lucien A. Bavetta, Ph.D., professor of biochemistry and nutrition, will be co-directors of the course.

In addition to dental health education, morphology and function of the teeth and prevention and control of dental disease will be among the topics covered.

FLUORIDATION STARTED IN ATLANTIC CITY

Fluoridation of Atlantic City's water supply was started in mid-March, although no public announcement was made until the program had been in effect for two weeks.

In the announcement, Richard S. Jackson, director of the Department of Parks and Public Property, said that no complaints of any kind had been received.

The question of fluoridation had been debated for more than six years before the City Commission enacted an ordinance providing for the institution of the health measure in December of 1956.

According to city officials, the start of fluoridation had been delayed because of difficulties in obtaining equipment.

EDWARD TAYLOR, FORMER HEAD OF DENTAL DIVISION, DIES

Edward Taylor, director of the Texas Dental Division from 1936 to 1954, died at the age of 67 March 15 in Lake Charles, La.

He graduated from the State Dental College in Dallas in 1917. Dr. Taylor was a Good Fellow of the Texas Dental Association and a life member of the Texas association and the American Dental Association. He had been active in the American Association of Public Health Dentists.

Dr. Taylor had been in poor health for several years.

Research

NIDR COMMITTEE TO AID IN RESEARCH ON PERIODONTITIS

The formation of a special committee to aid in developing a broadened research program on periodontal disease was announced in mid April by F. A. Arnold, Jr., director of the National Institute of Dental Research.

Immediate plans will be made for an accelerated effort to combat periodontal disease, which affects a large portion of older citizens. The special committee will work with the Institute and the National Advisory Dental Research Council.

Members of the committee are Edgar D. Coolidge, Chicago, chairman; Lucian A. Bavetta of Los Angeles; Frank E. Beube of New York; Henry M. Goldman of Boston; Harold C. Ray of San Francisco; and Helmut A. Zander of Rochester, New York.

Under the current program of the Institute, about $500,000 has been awarded for 36 research projects in the field of periodontal disease. The projects are on causes, methods of treatment, prevention and the effects of periodontal disease which lead to impaired mastication and

the need for dentures or partial prosthesis.

IADR ELECTS HILLENBRAND FIRST HONORARY MEMBER

Harold Hillenbrand, secretary of the American Dental Association, was elected to honorary membership in the International Association for Dental Research at the association's 36th annual meeting, held in Detroit March 20-23. Dr. Hillenbrand is the first person to be named an honorary member of the 38 year old society organized for the advancement of dental research.

The meeting was the largest in the association's history, with 722 persons registered and 240 papers presented.

Edgar D. Coolidge, professor emeritus, Loyola University School of Dentistry, was named honorary vice-president for the coming year.

Dr. James O. Beck, Jr., of Indiana University School of Dentistry was the recipient of the Edward H. Hatton Novice Award for the best paper by a young research worker. Ralph C. Burgess and Donald L. Anderson, both of the University of Toronto, received honorable mention citations to the Hatton Award.

George C. Paffenbarger, senior research

George C. Paffenbarger (left) accepts Souder Award from Denton L. Smith, assistant director of research, J. M. Ney Company

H. Trendley Dean (left), secretary of the A.D.A. Council on Dental Research and chairman of awards committee of I.A.D.R., awards honorable mention citations of the Hatton Novice Award to (l. to r.) Ralph C. Burgess and Donald L. Anderson. James O. Beck, Jr., (inset) was winner of Hatton Award

associate at the American Dental Association's Research Division at the National Bureau of Standards, received the Wilmer Souder Award for outstanding contributions to the field of dental restorative materials.

Newly elected officers of the International Association for Dental Research include Ned B. Williams of the University of Pennsylvania, president; Hamilton B. G. Robinson of Ohio State University, president-elect; Holmes T. Knighton of the Medical College of Virginia, vice-president; Dan Y. Burrill of Northwestern University, secretary-treasurer; Dr. Edward H. Hatton, professor emeritus, Northwestern University, assistant secretary-treasurer; and Frank J. Orland, director of the Zoller Dental Clinic of the University of Chicago, editor.

SUTHERLAND APPOINTED TO NIDR ADVISORY COUNCIL

Dr. Robert L. Sutherland, professor of sociology and director of the Hogg Foundation for Mental Hygiene at the University of Texas in Austin, has been appointed to the National Advisory Dental Research Council. Dr. Sutherland is the author of several books on sociology and on mental hygiene.

Dental Education

CRAWFORD HEADS ASSOCIATION OF DENTAL SCHOOLS

William H. Crawford, dean of the University of Minnesota School of Dentistry, took office as president of the American Association of Dental Schools on the final day of the association's annual meeting in Detroit, March 23-26.

Others elected were Robert W. McNulty, dean of the University of Southern California School of Dentistry, president-elect; Raymond J. Nagle, dean of New York University College of Dentistry, vice-president; and Marion W. McCrea, associate dean of the University of Minnesota School of Dentistry, secretary-treasurer.

Harry Lyons, dean of the School of Dentistry, Medical College of Virginia, and immediate past-president of the American Dental Association, was elected to membership on the Executive Committee for a term expiring in 1961.

A revised constitution for the association was presented to the membership on March 26 and was tabled for consideration at the group's 36th annual meeting, to be held in San Francisco in March 1959.

The general session on March 23 was on "Interrelations Between Research and Education in Modern Dentistry" and was sponsored jointly by the International Association for Dental Research and the American Association of Dental Schools. Subjects of other general sessions were "Teaching and Examinations" and "Television as a Teaching Medium in Dental Education." Conference sessions on various topics were also held during the four day annual meeting.

Roy G. Ellis of the University of Toronto, president of the association, presided.

COY TO CONDUCT COURSE AT UNIVERSITY IN TOKYO

Herbert D. Coy, professor of operative dentistry and director of the dental clinic at the Medical College of Virginia School of Dentistry and member of the Association's Council on Dental Research, will conduct a postgraduate course in all phases of operative dentistry for the teaching staff of the School of Dentistry of Nihon University, Tokyo, Japan.

He will leave for Japan May 4, ac-

companied by Mrs. Coy, and will return July 1.

The school will also sponsor lectures for its alumni in various sections of Japan during Dr. Coy's visit.

WASHINGTON TO OFFER TWO NEW MASTERS PROGRAMS

The University of Washington School of Dentistry, Seattle, has announced that two advanced courses of study in periodontics and endodontics will be given beginning in October 1958.

Both courses are 18 months long and lead to the degree of Master of Science in Dentistry. The courses are under the direction of Saul Schluger and John I. Ingle. Advanced courses in theory and clinical practice, along with original research and a thesis, are required.

Further information may be obtained from Dr. Schluger, director of graduate dental education at the university.

KRASSE OF SWEDEN BEGINS WORK AT ALABAMA UNIVERSITY

Bo Krasse, who is head of the bacteriology department at the Royal Dental School, Malmö, Sweden, has recently started work at the School of Dentistry of the University of Alabama, Birmingham.

Well-known for studies concerning caries bacteriology, Dr. Krasse will work with Joseph F. Volker during his half-year stay at the university.

GEOFFRION APPOINTED DEAN AT UNIVERSITY OF MONTREAL

Paul Geoffrion has been appointed dean of the Faculty of Dental Surgery at the University of Montreal, Canada.

Dr. Geoffrion, who was formerly associate dean, will continue to serve as director of the department of orthodontics.

Ernest Charron, formerly dean and director of studies, was appointed honorary dean, and Jean-Paul Lussier will serve as associate dean and director of studies. Dr. Lussier has been secretary of the faculty.

TODD ELECTED TRUSTEE OF BEREA COLLEGE

Russell I. Todd of Richmond, Ky., was elected to the Board of Trustees of Berea College in Kentucky in April. Dr. Todd, who completed his predental work at the college, is president of the American Association of Dental Examiners.

DENTAL SCHOOLS OFFER COURSES ON VARIED TOPICS

California • Two courses on hypnosis will be offered during June through the medical center of the University of California at Los Angeles. The courses are to be given to dentists, physicians and psychologists.

"Technics of Hypnosis" will be given June 16-17. The course will consist of demonstrations and practice training.

The course on "Advanced Technics and Application of Hypnosis," which is to be given June 18-20, will be conducted as a clinic.

Further information may be obtained from the medical center.

Fairleigh Dickinson • Fairleigh Dickinson University School of Dentistry, Teaneck, N. J., will present a postgraduate course for orthodontists June 8-11. The course will consist of lectures, practical demonstrations and instructions for using the edgewise arch mechanism in extractions. The faculty will include Harry Bull, William Jole, Walter Mosmann, Bernard Schanbam and Brainerd Swain.

New York • A tuition-free postgraduate course to familiarize practicing dentists with the principles of prosthetic treatment of cleft palate will be given from May 19 through May 29 by New York University College of Dentistry.

Supported by funds from the New York State Department of Health, the course will be given to a limited number of dentists from New York State. A stipend will be provided for dentists residing more than 25 miles from New York City.

Application forms and further information can be obtained from the postgraduate division of the college.

Northwestern • Northwestern University Dental School will give a one day postgraduate course on analysis and treatment of dental occlusal problems May 7. The program will consist of formal lectures on various aspects of occlusal relationship and problems connected with neuro-physiological aspects. The featured lecturer will be Henry Beyron of Stockholm, Sweden.

Further information may be obtained from the director of postgraduate study at the school in Chicago.

Pennsylvania • The Second International Conference on Endodontics will be held during the week of June 22 at the University of Pennsylvania in Philadelphia.

Outstanding essayists from the United States and other countries will participate.

The first International Conference was held in Philadelphia in 1953.

Further information may be obtained from Mrs. Mary Kolb, secretary, Thomas W. Evans Museum and Dental Institute of the University of Pennsylvania in Philadelphia.

Santo Domingo • The University of Santo Domingo College of Dentistry announces three courses to be given in conjunction with the University of Alabama School of Dentistry. These three courses will be given in Ciudad Trujillo, Dominican Republic.

E. Cheraskin of the University of Alabama will give a one week course in oral medicine from July 7-11. William L. McCracken of the University of Alabama will present a one week course in prosthodontics August 4-8, and a course in oral surgery will be given September 1-5 by René A. Puig Bentz of the University of Santo Domingo.

For further information, contact Fernando Camino Cestero, Dean, University of Santo Domingo College of Dentistry, Ciudad Trujillo, Dominican Republic.

Texas • The University of Texas Dental Branch in Houston will present a postgraduate course in maxillofacial surgery June 16-20. Attendance is limited, and tuition will be $125.

Washington • The University of Washington School of Dentistry, Seattle, will give a course on exodontics and minor oral surgery June 2-13.

The course for general practitioners will consist of lectures, practical demonstrations and clinical practice by the participants.

Tuition will be $165, and all supplies except gowns will be furnished.

International

A.D.A. MEMBERS INVITED TO PAN AMERICAN CONGRESS

Robert M. Ruff, president of the Mexican Dental Association, has invited all members of the American Dental Association to attend the Pan American Dental Congress, to be held in Mexico City November 18-22, immediately following the annual session of the American Dental Association in Dallas, Texas.

The Congress is sponsored by the Mexican Dental Association. Leading dentists from the Western Hemisphere will present essays and clinics. Social events and sightseeing tours will also be given in conjunction with the Congress.

Mr. J. D. Howard has been appointed travel coordinator. He is also in charge of the U. S. headquarters for the Congress, which have been established at 1715 Pacific Ave., Dallas, Texas. Inquiries and registration of dentists from the United States who wish to attend the Congress will be handled through the Dallas headquarters. Also, dentists who wish to present lectures or clinics at the Congress may apply through the U. S. headquarters.

AUSTRIAN DENTAL GROUP PLANS MEETING IN SALZBURG

The Central Organization of the Austrian Societies for Dental Research will hold its annual meeting September 18-21 in Salzburg.

Information about the meeting and applications for participation may be obtained from Karl Czerwenka, Franz Josef Strasse 12, Salzburg, Austria.

CENTRAL AMERICAN DENTAL FEDERATION PLANS MEETING

The Odontological Federation of Central America and Panama will hold its second international convention in San José, Costa Rica, November 26-29.

Symposiums will be given on prosthetic dentistry and on dental education and dental medicine. Leading American and Latin American dentists will participate in the program.

The Federation is an organization composed of dental societies of Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama. The group held its first convention in Guatemala last September.

Further information can be obtained from Roberto Chartier, president of the Odontological Federation of Central America and Panama, Apartado Postal 698, San José, Costa Rica.

AMERICAN DENTAL SOCIETY OF EUROPE TO MEET IN JULY

The American Dental Society of Europe will hold its annual meeting July 2-5 at the Casino in Knokke, Belgium. In addition to the scientific program, various social events will be held.

Further information may be obtained from James P. Molony, secretary of the Society, at 110 Harley St., London. Hotel reservations may be made through the American Express Company, 51 Rue Cantersteen, Brussels.

PAN AMERICAN COUNCIL NAMES NEW OFFICERS

Benjamín Gómez Herrera of Colombia is the president of the Pan American Council of Dentistry for Children.

Other officers include Albert L. Anderson, Jr., of San Diego, Calif., president-

The First Isthmian Dental Congress, co-sponsored by the Panama Canal Zone Dental Society and the Asociación Odontológica Panameña as part of the activities of Panama National Dental Health Week, was held January 17 in Panama City. Edward R. White, fourth district Trustee of the American Dental Association, was one of the speakers. Shown at the opening of the Congress are (l. to r.) Alfredo Berguido, president of the Asociación Odontológica Panameña, presiding; Lt. Col. Clare W. Sauser, U. S. Army, president of the Panama Canal Zone Dental Society; Roberto Chartier of Costa Rica, president of the Federación Odontológica de Centro América y Panamá; Monsignor Francisco J. Beckmann, C. M., archbishop of Panama; and Don Ernesto de la Guardia, Jr., president of the Republic of Panama.

William R. Alstadt, president of the American Dental Association, and other dental representatives who attended the Second Asian Dental Congress, held in Manila in late March, visited Charles E. Bohlen, U. S. Ambassador to the Republic of the Philippines. (L. to r.) Capt. Anthony K. Kaires, staff dental officer, U. S. naval forces in the Philippines; Bienvenido B. Eraña, president of the Asian-Pacific Dental Federation; Ambassador Bohlen, Col. Agustin L. Zarate, president of the Philippine Dental Association; and Dr. Alstadt

elect; María I. Navarra of Uruguay, vice-president; Antonio Montero of Cuba, secretary; Alicia Lázo de la Vega of Mexico, treasurer; and Carlos A. Criner of Cuba, editor.

At their second meeting in Miami last November, the group approved a non-voting, sustaining membership which allows attendance at meetings of the council. The dues are $5 a year. Funds from sustaining memberships will be devoted to public relations and research programs. Further information on the memberships may be obtained from Dr. Montero, L 353, Vedado, Havana, Cuba.

NEWS SECTION OF BRITISH JOURNAL HAS NEW LOOK

Beginning in the March 18 issue, the news section in the *British Dental Journal* took on a new look, with a new format and more extensive use of pictures.

The format is similar to that of a newspaper. The changes were the result of a policy change by the Council of the British Dental Association.

The major stories in the issue concerned a visit of Prince Philip, Duke of Edinburgh, to the dental association's headquarters to receive a certificate of honorary membership. A profile story of Harry Davis, president of the British Dental Association, was also published in the March 18 issue of the *British Dental Journal*.

COLOMBIAN FEDERATION HOLDS FIRST CONGRESS IN BOGOTA

The Federación Odontológica Colombiana held its first congress at the School of Dentistry of the National University of Colombia in Bogotá, March 30 through April 2.

Rafael Tórrez Pinzón, former dean of the School of Dentistry of the National University, was awarded a medal of merit for his services to education. He also received a gold plate signed by the presidents of all delegations to the congress.

Lectures and table clinics were given during the congress.

National Defense

JAMES A. ENGLISH HEADS NAVY DENTAL RESEARCH

Capt. James A. English relieved Capt. William E. Ludwick as head of Navy dental research on April 1.

In his new position, Capt. English will supervise all dental research projects in Navy facilities as well as those sponsored by the Navy in civilian universities. He will head the Medicine and Dentistry Branch in the Office of Naval Research in Washington, D. C., and he will also be head of the dental branch of the Research Division in the Bureau of Medicine and Surgery.

Capt. Lutlwick will assume the position in the Office of Naval Research in London that was vacated by Capt. English.

ANTARCTIC DENTAL SOCIETY HOLDS FIRST MEETING

The first meeting of the "Antarctic Dental Society" was held February 7 at the U. S. Naval Base, McMurdo Sound. Participants were Lieutenants Theodore A. Bodine, Jr., Max J. Perlitsh and Newton L. Vermilion, all members of the Naval Dental Corps.

The Navy dentists believe that the dental meeting was the first to be held in Antarctica, although other Navy dentists have "wintered over" in Antarctica.

NEW NAVY DENTAL CLINIC ESTABLISHED AT LONG BEACH

Capt. Frank E. Jeffreys is the commanding officer of the newly commissioned naval dental clinic at Long Beach, Calif.

The new clinic was commissioned early this year to provide better dental support for fleet units in the Long Beach area. It is staffed by 16 Navy dental officers, a warrant officer and 31 dental technicians. It is the tenth naval dental clinic command to be established under the command of a dental officer.

General

LONG, ONLY DENTIST MEMBER OF CONGRESS, DIES

Rep. George S. Long of Louisiana, the only dentist member of Congress and the supporter of many Association proposals relating to dentistry, died March 22 at the Naval Hospital in Bethesda, Md., after suffering a heart attack two days earlier. Rep. Long was 74.

Funeral services were held in Pineville, La., and memorial services were held in Washington, D. C., March 24.

The Louisiana Dental Association at their annual meeting in Monroe, La., passed a resolution citing Rep. Long as a "dedicated and devoted representative of organized dentistry throughout his long tenure in the House of Representatives. . . ."

Rep. Long graduated from New Orleans Dental College in 1903 and practiced dentistry in Oklahoma and Louisiana from 1904 to 1952. He was admitted to the bar in Oklahoma in 1923. He was elected to the House of Representatives as a Democrat from Louisiana in 1953. Rep. Long was a prominent member of the House Administration and Veterans Affairs Committees.

He is survived by his widow, the former Jewell Tyson. Rep. Long was the brother of the late governor and senator Huey P. Long and of Louisiana's present governor, Earl Long. He was also the uncle of Senator Russell Long of Louisiana.

ORAL PATHOLOGY BOARD TELLS DATES OF EXAMINATION

The American Board of Oral Pathology will hold its annual examination for certification December 6 and 7. The

place of the examination will be announced when the geographical location of the applicants has been determined.

All applications should be sent before July 1 to Donald A. Kerr, the secretary of the Board, at the University of Michigan School of Dentistry, Ann Arbor.

SAMUEL CHARLES MILLER DIES AT AGE 54

Samuel Charles Miller died at the age of 54 February 8. He was professor and chairman of the department of periodontics and oral medicine at New York University College of Dentistry, having served on the faculty since his graduation from the school in 1925.

He was founder and first president of the American Academy of Dental Medicine and a member of the American Academy of Periodontology, the International Association for Dental Research and the American Dental Association.

The author of several books, he was a diplomate of the American Board of Periodontology.

Dr. Miller is survived by his wife and two daughters.

CONFERENCE ON EMPLOYING HANDICAPPED TO BE HELD

President Eisenhower will address those attending the 1958 annual meeting of the President's Committee on Employment of the Physically Handicapped, which will be held May 8 and 9 in the Commerce Department auditorium in Washington, D. C.

The president will also present awards to certain individuals for outstanding service in their particular fields.

Capt. Curtiss W. Schantz, commanding officer of the Naval Dental School, has received an invitation from the White House and will attend the meeting.

APPLICATIONS BEING TAKEN FOR DENTAL POST WITH WHO

Applications are being taken for the position of dental health officer with the World Health Organization in Geneva, Switzerland. Carl L. Sebelius, who presently holds the position, plans to vacate the post in September 1958.

The dental health officer is responsible for planning and guiding the dental programs of WHO, organizing epidemiological investigations and preparing reports to facilitate the utilization of preventive and control procedures.

The beginning salary is $8,750 per year, tax free, plus allowances and other benefits. The maximum salary is $11,000 plus allowances and benefits.

Qualifications include a university degree in dentistry, and training in a recognized school of public health is desirable. The applicant must be fluent in English or French and be able at least to read the other language. At least five years' experience in dental health administration is required.

Allowances are given for a wife who is unemployed or children under 18 or in school. An allowance is also given to ease the financial burden of the settling in period. There is also a post adjustment allowance.

Thirty working days of leave are allowed each year, with home travel paid every two years.

Applications may be sent to the personnel section, World Health Organization, Geneva.

COLLEGE GIVES DINNER HONORING HOLLENBACK

The Alumni Association of the College of Physicians and Surgeons, San Francisco, sponsored a testimonial dinner April 20 at the Mark Hopkins hotel honoring George M. Hollenback of Encino, Calif., for his contributions to the science of dentistry.

MINNEAPOLIS TO BE SITE OF WORLD HEALTH ASSEMBLY

The United States will be host to the 10th annual World Health Assembly of WHO, which will be held in Minneapolis beginning May 26, 1958. The Assembly will be the first to be held in the United States.

The World Health Organization offers direct assistance to countries on request to enable them to fight disease and strengthen health services and deals with epidemic warnings, quarantine measures, recommendations of international standards for drugs and with health statistics, which are of value to all countries.

DISABLED DENTIST OFFERS SUBSCRIPTION SERVICE

Louis W. Soldan, a dentist who was disabled by polio about eight years ago, runs a professional subscription service for magazines and periodicals in Framingham, Mass.

Dr. Soldan was in practice in Boston when he was stricken with polio. Through his service, he handles gift, new and renewal subscriptions for all domestic and professional journals. He also maintains a reminder service for renewals.

Dr. Soldan says that the lowest rates available may be obtained through his service. His office is at 135 Edgewater Dr., Framingham, Mass.

ACADEMY OF RESTORATIVE DENTISTRY NAMES OFFICERS

Ralph C. McClung of Birmingham, Ala., is president of the American Academy of Restorative Dentistry. Other officers include Allison G. James of Beverly Hills, Calif., president-elect, and Morton H. Mortonson, Jr., of Milwaukee, secretary-treasurer.

The next annual meeting of the Academy will be held in Chicago February 7 and 8, 1959.

JOHN CRONIN, ASSISTANT PHS SURGEON GENERAL, DIES

John W. Cronin, M.D., assistant surgeon general and chief of the Bureau of Medical Services of the Public Health Service, died of a heart attack March 26. He was 52 years of age.

Dr. Cronin collapsed after presiding over a staff meeting.

A career medical officer in the Public Health Service, Dr. Cronin received his medical degree from the University of Cincinnati. He is survived by his wife, Virginia, and a son and a daughter.

BOARD FOR CERTIFICATION OF TECHNICIANS TO MEET

The National Board for Certification of dental laboratory technicians will hold its second meeting May 24 and 25 at the Lake Shore Athletic Club in Chicago. The board will consider the bylaws and make the final provisions for setting up the schedule for certification examinations of technicians.

CORRECTIONS

An error occurred in the lists of prices given for two brochures on page 413 of the March issue of THE JOURNAL. *X-Rays and Your Teeth* is priced at $1.30 for 25, $2.25 for 50 and $3.60 for 100, and *Your Artificial Dentures* is priced at $1.75 for 25, $2.95 for 50 and $4.85 for 100.

The position at the University of Washington to which Saul Schluger was appointed was reported incorrectly on page 418 of the March issue. Dr. Schluger was named professor of periodontics and director of the graduate dental program.

Dental activities in the Republic of China

J. L. Wong, D.D.S., L.D.S., Taipei, Taiwan, China

Scientific dentistry was introduced to China by Canadian missionaries in the early 1890's, but dental education at the college level did not begin until 1918, when Ashley Lindsay of Canada organized the first class in the college of dentistry in West China Union University, in Szechuen.

The number of schools offering a four-year course was raised to two in the 1919-1920 scholastic year, when Loyola University of Shanghai, a Roman Catholic institution, started its dental school.

The government of the Republic of China formally recognized scientific dental education in 1933 by commissioning the author (University of Minnesota 1922) to institute the First National Dental College at Nanking.

Since that time, the college has offered a six-year course leading to the degree of Bachelor of Dental Surgery, and has graduated more than 200 qualified dentists for the Republic. Most of them are practicing in China, a number with the military service. Some eight or ten are engaged in the teaching of dentistry with professorial rank, in various schools.

During the third year of the Chino-Japanese war, in 1940, the author, in charge of a fully-equipped dental unit, was ordered to establish a hospital in the First War Zone, at Loyang in the province of Honan. Training classes for military dental auxiliaries—chair assistants, dental hygienists and technologists—were started at the hospital in 1941. Many of the graduates are still serving in China's armed forces.

After V-J Day in 1945, large-scale training was begun in Shanghai of military dental surgeons, each of whom receives a Bachelor of Dental Surgery degree and a first lieutenancy in China's armed forces on successful completion of the six-and-a-half year course.

The training school, which is co-educational, was designated the National Defense Medical Center, whose over-all mission was to train medical, dental, nursing, field service and pharmacy personnel for the armed forces. The writer was appointed dean of the dental college, at the head of a teaching staff of 17, most of whom were graduates of American dental schools, or received their training from U. S. Army Medical and Dental Training Centers. The capacity of the dental department is 150 students.

When the Communists invaded the mainland in 1949, the National Defense Medical Center was evacuated to Taipei, Taiwan. For the next few years it experienced great difficulty in re-establishing itself with a new staff and inadequate equipment. During the first few months, the 120 students then enrolled held "open air" classes and were quartered in rude huts.

Dean, Department of Dentistry, National Defense Medical Center, Republic of China.

Ultimately, with the fine assistance and close co-operation of the United States military advisory government aides, the author was able to rebuild the dental department, which is now fully recognized by dental education authorities in both America and Europe.

Many of the graduates now are taking advanced dentistry courses in the United States, and, covering the period from 1949 to 1957, all 125 graduates of the dental department have served or are serving in the dental branch of China's armed forces.

It was not until 1954 that the first civilian dental school was established, at National Taiwan University. This school (in the organization of which the writer was proud to be an adviser) offers a seven-year course, carrying a Bachelor of Dental Surgery degree conferred by the Ministry of Education. It will not graduate its first class until 1961, but the output after 1966 is expected to be 10 to 15 graduates a year.

The Kao-Hsuing Medical College, privately operated by C. M. Tu, formed its dental department in 1956. A co-educational school, it boasts of an excellent teaching staff and fine equipment, and has an unusually large freshman enrollment of 40 in the dental department. Here, too, the course is seven years.

At the Tai-Chung Vocational School, incorporated in 1957, a four-year dentistry course is offered. Graduates receive a diploma, along with a government license to practice.

The government Public Health Service has established free dental services in schools, factories and public health centers.

To co-ordinate the government's dental health program, the seven-member National Board of Dental Examiners, of which the author is chairman, was given authority in 1954 by the government to examine all candidates for license to practice.

In recent years, Free China has manifested great interest in international dental affairs. As evidence of this trend, the government sent the writer as delegate first to the WHO Dental Seminar at Wellington, New Zealand, in 1954, and then to the International Dental Congress in Rome, Italy, in 1957.

In summary, there has been a tremendous stress placed upon dental health and care within the Republic of China within the past decade.

Spurred by success of the National Defense Medical Center program, the government has undertaken to encourage activity by civilian schools (both publicly and privately operated) that will produce a sufficient number of competent, trained dentists to meet the needs of my people.

Much remains to be done, of course, but a solid groundwork has been laid.

BUREAU OF DENTAL HEALTH EDUCATION

National Children's Dental Health Week 1958

The 10th annual National Children's Dental Health Week was observed from February 2 to 8, 1958. No report on the observance, which was countrywide, can be complete. But an idea of the various ways in which the week was observed can be gained from a brief description of some of the activities reported by dental societies.

Television and radio were widely used as media for presenting programs concerned with children's dental health. In Rhode Island, U. S. Rep. John E. Fogarty opened National Children's Dental Health Week on a television program January 31. Films made then were run on national newstime. Two television stations provided one ten-minute and three five-minute periods during which members of the Rhode Island State Dental Society discussed children's dentistry. Spot announcement films were run before, during and after NCDHW—about 35 showings. On four radio stations spot announcements were made every hour on the hour during dental health week.

The Nassau County Dental Society (in New York) interested several directors of children's television programs in National Children's Dental Health Week. Each was enthusiastic about presenting dental health information to his audience. There was even a publicity bonus—the local newspaper presented a television salute to all the personalities involved, as its own tribute to National Children's Dental Health Week.

New York City had two closed-circuit television programs—one for 600 families in a housing project and the other for children in classrooms.

Oklahoma's "Smile of the Year" Coronation Banquet received more publicity this year in newspapers and on television than it ever had before. Not one but five television stations sent cameramen to film the program.

Winners of the smile contest, chosen from the approximately 50,000 Oklahoma junior high school pupils examined, were Rhoda Watson of Ardmore and Dan Huffman of Bethany. As "king" and "queen" they received wrist watches and state "Smile of the Year" cups to be displayed in their respective schools. Other "royalty" was present at the banquet too—Sandra Sue Stout of Piedmont, the national dairy princess.

Finals of two smile contests sponsored by local dental societies—in Philadelphia and Houston—also were televised.

Minnesota was especially active in trying to get radio coverage for NCDHW. The state association's dental health education committee appointed a local dentist to arrange for radio time for a dental program in every community in the state which has a radio station. Scripts and transcriptions were available from the state committee on request.

Programs were given and spot announcements made on 30 radio and television stations in Iowa. The TV station at Watertown, S. D., gave the local dental society free time. In addition, the local dairy association offered some of its paid time for the presentation of dental health messages. In Portland, Oregon,

"King" and "Queen" chosen in Oklahoma's "Smile of the Year" contest were Dan Huffman of Bethany and Rhoda Watson of Ardmore. Five television stations sent cameramen to film the coronation banquet

Finals of Philadelphia's "Winning Smile" contest were telecast. Pictured are (seated, l. to r.): Martha Gable, director of TV and radio, Philadelphia Board of Education; Abram Cohen, supervisor, dental services, Philadelphia Board of Education; Dr. Allen H. Wetter, superintendent of schools; Mrs. Leon Prince, president, Home and School Council; John C. Piscator, president, Philadelphia County Dental Society, and Dr. Ruth Weaver, director of medical services, Philadelphia Board of Education. Standing are the contest winners, Arlene Carey of Tilden Junior High School and Hans Kalkbrenner of Cooke Junior High School

The Hon. Luis Muñoz Marin, Governor of the Commonwealth of Puerto Rico, signs the proclamation for 1958 National Children's Dental Health Week for the island. From left to right are: Carlos Noya, NCDHW chairman; Francisca Guerra, director of oral hygiene for Puerto Rico; the governor, and Reinaldo Carrasquillo, president, Puerto Rican Dental Association

Among those present at the opening ceremonies of the dedication of Times Square as "Children's Dental Health Square" were (l. to r.) Harold Addelston, president-elect of the American Society of Dentistry for Children; Percy Phillips, president-elect of the American Dental Association; Jules Seldin, president of the First District Dental Society of New York, and Dr. Leona Baumgartner, Commissioner of Health for New York City

A family in the Elliott Houses, a New York City housing project, watches a closed-circuit television program, a panel discussion on dental health

Enlargements of the National Children's Dental Health Week poster were displayed on billboards at strategic places in New York City. The one at 47th St. and Broadway—the upper apex of Times Square—is pictured here

prizes in a poster contest for school children were awarded during a television program.

Television scripts (364) and sets of flip cards (88) were sent free by the Bureau of Dental Health Education to those requesting them. The Dentists' Supply Co. of New York cooperated with the American Dental Association in producing a new series of five TV spot announcements.

Throughout the country dentists spoke to school children and to adult groups about dental care. Dental societies distributed posters and other material to the schools. Free toothbrushes were presented to 400 third graders in North Adams, Mass., by the Western District Dental Society.

Several pilot programs were conducted in junior high and high schools in New York. In junior high schools, dentists and other dental personnel, through table clinics, showed the relationship of the science and art of dentistry to the students' school work. In high schools, programs stressed careers in dentistry. The New York State Dental Society purchased material in quantity from the American Dental Association to give to dental hygienists for distribution in the schools.

In Georgia the state dental society, state department of public health and state department of education worked together at the state level and encouraged cooperation at the local level.

All school superintendents and school, county and regional nurses in Iowa received promotional material for NCDHW.

Many governors and mayors issued proclamations officially designating February 2 to 8 as National Children's Dental Health Week.

Times Square in New York City was re-dedicated (temporarily) as Children's Dental Health Square. A square in the Bronx was also re-named Children's Dental Health Square.

Milwaukee dentists launched the week at a civic dinner, which also marked the observance of the 50th anniversary of the Greater Milwaukee Dental Association's affiliation with the Wisconsin State Dental Society.

Many newspapers gave excellent coverage in copy and pictures to dental health for children and to activities of dental societies during the week.

Drugstores and other businesses in all parts of the country were most cooperative in providing window space for displays of posters and other material. The Minnesota Pharmaceutical Association made available to druggists about 400 posters for window displays during National Children's Dental Health Week. As the posters are of year-round value, it was suggested that druggists present them to schools after the special week had ended.

In Arkansas questionnaires were sent to all local chairmen. The purpose was to learn what had been done this year and to get suggestions and comments that will help in planning next year's program. Because of the planning done at the state level, a large number of Arkansas communities are very active in sponsoring observance of the week. Ninety-one per cent of dental societies replying to the questionnaire by the middle of March had distributed dental health education materials. Eighty per cent said NCDHW had received adequate publicity (in newspapers and on radio and television) in their communities this year—a large increase over previous years.

Southern California observed Children's Dental Health Week a month later—the first week in March. Special posters were prepared by shippers and suppliers of fresh fruits and vegetables in cooperation with the Los Angeles County Dental Society. Copy on the poster read: "Nature's Toothbrushes. Eat fresh fruits and vegetables—they sweep the teeth clean. Be sure to brush teeth regularly and have dental check-ups. Fresh fruits

and vegetables for snacks and desserts." Illustrations showed various fruits and vegetables, a girl eating a carrot and a boy eating fruit. Before the posters were completed, school personnel was asked to look at them and to make suggestions. Fifty thousand posters, plus 600,000 miniature posters, were distributed during Children's Dental Health Week.

In Kern County an afternoon and evening were set aside for all school and P.T.A. personnel to see new dental health education materials. The Orange County Dental Society cooperated in the writing of two books on dental health education —one resource materials for sixth grade teachers and the other a textbook for sixth grade pupils.

The number of NCDHW posters distributed this year by the Bureau of Dental Health Education was 250,308; the number of program planning kits, 4,201. Materials were sent to 1,632 individuals in 1,242 communities in the 48 states, Alaska, Hawaii, Puerto Rico, District of Columbia, Virgin Islands and two foreign countries. The Association of Toothbrush Manufacturers made available a grant of money for the production and distribution of 1,000 displays, which were sent to the dental societies in the various states and territories. These displays were suitable for use in store windows and school buildings.

It is impossible to report all the activities of all the states, but even this incomplete summary may suggest some ideas dental societies may want to consider for next year. Now is the time to begin thinking about the 1959 (centennial year) NCDHW observance. State dental societies can appoint state chairmen and committees, which can make initial plans on the basis of experiences in 1958. Local dental societies can appoint their chairmen early and send the names to the state chairmen.

If each state chairman can submit the list of requirements for his state to the Bureau of Dental Health Education early in the fall, materials can be distributed and planning then begun locally.

COUNCIL ON LEGISLATION

Association officials again petition for funds for dental institute building and research grants before House appropriations subcommittee

On February 26, the Council on Legislation presented testimony before a subcommittee of the House of Representatives Appropriations Committee headed by Representative John E. Fogarty (R.I.). Floyd W. Pillars, vice-chairman of the Council, urged that the $3,700,000 needed to construct the National Institute of Dental Research building be provided this year. H. Trendley Dean, secretary of the Council on Dental Research, spoke in favor of a $1,000,000 increase for the Dental Institute's research grant program. Bernard J. Conway, secretary of the Council on Legislation, also participated in the hearing. The Association's testimony follows:

DR. PILLARS' TESTIMONY

I am Floyd W. Pillars of Des Moines, Iowa, member of the Council on Legislation of the American Dental Association. With me is H. Trendley Dean, secretary of the Association's Council on Dental Research, and Mr. Bernard J. Conway of Chicago, secretary of the Association's Council on Legislation. I am here today to present the Association's recommendations on the need for construction funds for the National Institute of Dental Research.

RECOMMENDATION

The American Dental Association urges Congress to include in the fiscal 1959 budget for the Public Health Service $3,700,000 for the construction of a building and facilities for the National Institute of Dental Research.

This occasion marks the passing of a decade since the American Dental Association successfully petitioned Congress to enact legislation authorizing construction of a building to house the National Institute of Dental Research. During that period, the need for the building has been demonstrated and documented over and over again.

In 1948, as the members of this Committee know, Congress, with the approval of the President, determined that the building was desirable and necessary. Since then—save for a period during the Korean emergency—this Committee, its counterpart in the Senate, other Congressional Committees and the American Dental Association have gone on record strongly favoring immediate construction. The Public Health Service also is on record in several instances in support of the urgent need for the building. In 1956, Congress passed and President Eisenhower signed legislation authorizing additional construction funds for the dental research building (P.L. 732, 84th Congress).

In spite of this seeming unanimity, and the existence of authorizing legislation, the building has not been constructed.

As this Committee noted last year, "there is ample information in the hearings with regard to the urgent need for . . . a new dental research building." The Association does not wish further to burden the record with the clearly recognized evidence of the extent to which work at the Institute is being retarded for lack of space and facilities. We do wish to point out, however, that the situation grows cumulatively worse.

In order effectively to carry out its mandate from Congress to conduct investigations in basic and clinical research, the National Institute of Dental Research must have the 35,000 square feet of working space to be provided in the proposed building. Less than 10,000 square feet are now available to the dental scientists. In terms of individual space requirements, the recognized minimal standard is 150 square feet for each principal investigator. The allowance at the present location of the National Institute of Dental Research is about 112 square feet. In the last year, there has a been a decrease in available space of 13 square feet per investigator.

The inadequacy of space and facilities is undoubtedly having an effect on the morale of personnel at the Institute. We understand that increasing difficulty is being encountered in retaining skilled people. Several highly qualified employees left the Institute during the last two years. We are informed that the majority of these principal investigators did so primarily because of dissatisfaction with facilities and, more importantly, because of the Institute's inability to provide space for an adequate staff of technicians to assist the scientists. In time of acute shortages of skilled scientific investigators, we consider this to be a deplorable state of affairs. It is certainly inconsistent with the avowed policy of the Government of encouraging basic scientific endeavor.

Because of the shortage of physical facilities, critically needed investigations have been deferred; others have been curtailed. Those which have been carried on have been hampered by the overcrowded and inconvenient physical layout of the present facilities. Certainly, there is ample justification for the conclusion reached by the Senate Committee on Labor and Public Welfare that, ". . . lack of proper facilities for the Dental Institute's program poses a serious threat to this nation's progress toward effective control and prevention of dental disease."

The hard fact is that the research job which can and ought to be done, cannot be done under existing conditions. The recorded hearings of this Committee are replete with irrefutable evidence supporting that statement. This Committee on more than one occasion has brought it pointedly to the attention of the Executive branch.

Yet, the budget request for fiscal 1959 is glaring in its omission of any allocation of funds for construction of the dental research building. In reply to a letter from the American Dental Association president to the President of the United States, a member of the Chief Executive's staff informed the Association that "initiation of construction of dental research facilities in the near future is not presently contemplated." Does this mean that the plans and specifications that have been

prepared at considerable cost will be mothballed and construction again deferred for an indefinite period?

In the past, failure to go ahead with construction has been defended on grounds of economy and inflation. In view of available information, however, and as pointed out last year in the report of this Committee, both of these arguments are of extremely doubtful validity. A Senate Committee concluded, and we are in accord, that "Failure to initiate the construction of the Dental Institute building at the time Congress authorized the project has proved a most costly postponement." Because of rising costs, at least $2,000,000 has been added to construction cost. Originally, the building could have been constructed with half the funds now required. Additionally, substantial amounts have been spent during recent years to rent space for some essential activities of the National Institutes of Health. The National Institute of Dental Research, itself, currently is renting space in Silver Springs. At least one other Institute is forced to rent outside quarters because of the unavailability of the space now occupied and used for dental research operations. We fail to understand how economy is being served by the prolongation of this situation.

The American Dental Association is not unmindful of the tremendous expenditures which must be made in the interest of national security. At the same time, it is felt that certain critical health needs should not continue to be ignored. Actually, the health and well-being of our citizens have a direct relation to national security. Considering the dimensions of the dental health problem, discoveries which may be in the offing in research conceivably would improve the health of millions of people and thus contribute substantially to our total preparedness effort.

The dental profession has increasing difficulty in coping with the dental health problem. It is too big. Ninety-five per cent of the population is afflicted with dental disease; population increase, furthermore, will continue to be proportionately greater than the increase in dentists.

This nation simply cannot afford to continue to attempt to meet the problem by the endless treatment of the disease after it occurs. Such an approach is costly and largely ineffective. This is illustrated by the fact that over a billion and a half dollars are being spent each year for dental care, yet only about 40 per cent of the people are receiving adequate treatment. The only answer to the problem lies in research. Only through research will there be found the means of prevention and early control of dental disease.

The American Dental Association is acutely conscious of the need for large expenditures for national defense. However, it is believed that consideration also should be given to expenditures for facilities, such as the dental research building, which have a direct relation to the protection of the public health and for which a truly critical need exists. In relation to the proposed multibillion dollar budget, which includes large amounts for nondefense as well as defense items, the four million dollars required for the dental research building seems a small price for the benefits which would result.

The American Dental Association urges Congress to appropriate the funds for the dental research building. Perhaps, with the weight of the combined judgment of Congress and the thousands of citizens who are deeply interested in the public health, we can yet induce action on this vital project.

At this time, gentlemen, I should like to introduce H. Trendley Dean, former director of the National Institute of Dental Research and now secretary of the American Dental Association's Council on Dental Research. Dr. Dean will present the Association's recommendation on the need for expansion of the Institute's project grant program. Because of his direct experience with the Institute and his close association with dental research over the years, Dr. Dean is eminently qualified to speak on this subject.

DR. DEAN'S TESTIMONY

The American Dental Association recommends that the fiscal 1959 appropriations for the dental health activities of the Public Health Service be increased from the $6,293,000 proposed in the President's budget to $7,293,000. This recommended increase of one million dollars would be used to further the grants program of the National Institute of Dental Research, and would be in keeping with a policy recommendation of the Association's House of Delegates adopted in 1957. A copy of that action is appended to this statement.

PROJECT GRANT PROGRAM OF THE NIDR

The American Dental Association again wishes to express its appreciation and to commend the members of this subcommittee for their continued support of the dental research program at the National Institutes of Health. As recently as ten years ago, federal support of dental research was practically nonexistent. Up to that time, despite the fact that dental disease is the nation's most prevalent disease—

afflicting 95 per cent of the population—there was no coordinated plan under which personnel and facilities could be marshalled for an investigation into the causes of dental disease.

This subcommittee can take pride in the fact that such a program is now a reality and that investigators from all parts of this country are now making an intensive search into the nature of oral diseases and their relation to the general health of our people. This expansion occurred chiefly as a result of the appropriations recommended by this committee in 1956 and 1957 for grants to the dental schools and other dental research centers.

The 45 dental schools and a number of other dental research institutions responded with such vigor and enthusiasm that today over 90 per cent of the dental schools have undertaken projects which are contributing immeasurably to an understanding of the myriad problems connected with dental disease. This phenomenal progress in oral research is a direct result of the federal government's financial contribution. In place of a serious weakness in the dental health area of this nation's total research offensive against the diseases of mankind, there is now the foundation of a strong and flourishing dental research program.

It must be recognized, however, that this program is yet in the beginning stages. In terms of the research capacity of this nation, the potential in the area of oral disease investigation has only been touched. The American Dental Association believes that much more needs to be done; for example, with available personnel and facilities, the dental schools are in a position to carry on at least a hundred projects in addition to those being conducted and those to be activated this year.

The growth of research in the dental schools, moreover, is essential to a continuing improvement in the standards of dental education.

Increased federal support of research projects is responsible in large part for a significant improvement in the quality of the training now provided to dental students. As you are well aware, research is a prime characteristic and necessary discipline of all higher education. It is especially important in health sciences such as dentistry. As a result of the Dental Institute's grant program, the majority of our dental schools has been able to make much needed improvement in their research training activities. By encouraging increased participation in both basic and applied research by faculty members, as well as students, the National Institute of Dental Research has made a commendable contribution to our entire dental educational system.

The benefit to be derived from a complete clinical and laboratory research program conducted as a part of the dental school regimen is invaluable. Such a program is the means of arming each new dentist with a broad understanding of the nature and underlying causes of diseases of the human body and the most modern advances in prevention and treatment.

The emphasis in dental schools, of course, is on oral diseases. But, through his experience in research, particularly during his basic science courses, a newly graduated dentist also has a deep knowledge of the relationship of oral diseases to general systemic disorders. Thus trained, the dentist becomes a special bulwark in the fight against not only oral diseases but many other human ills as well.

I can illustrate briefly the importance of this phase of dental training by pointing out its application to specific diseases.

To appreciate the significance of oral diagnosis, one should be cognizant of the fact that there are thousands of people who each year visit their dentists but do not visit their physicians. Some of these people may be suffering from diseases which are other than dental in character but are manifested in the mouth. This is true, for example, of diabetes. The earliest signs of some forms of this disease are found in the oral cavity. Through research and training programs, the schools are attempting to develop improved diagnostic technics to aid in the detection of oral symptoms of diabetes.

When new technics of diagnosis have been developed, the dentist going out into practice will apply them as a routine part of his examining procedure, and will thus detect even more of these insidious cases than he is able to do today.

Likewise, in the case of cancer, several grant projects are directed toward the development of new diagnostic technics. As you know, the only known effective treatment for cancer is early detection followed by surgical or radiological therapy. The possibilities of saving additional lives will be increased manyfold by the routine application of improved procedures for cancer diagnosis in the daily practice of dentistry.

These are but a few of the advances which are directly related to the project grants program. There are many more. Attached to this statement are descriptions of research activities which should be greatly expanded.

NEED FOR GRADUAL BUT CONSTANT INCREASES

In the judgment of the Association's Council on Dental Research, the modest increase recommended by the Association will permit a carefully considered and desirable expansion of the Dental Institute's grant program which will enable the Institute to take prudent advantage of presently available manpower and facilities. In terms of physical facilities and trained personnel, available resources are more than adequate to accommodate the expansion we are advocating. The dental schools and other research institutions have the capacity and are eager to undertake investigations in many vital but virtually untouched areas of dental health.

The information to support this view has been obtained by the Council on Dental Education, the Council on Dental Research and other agencies of the American Dental Association which are continuously in touch with the dental schools and other institutions where a large part of dental research is in progress. This information has been supplemented with grant records as published by the National Institutes of Health or as obtained from the National Institute of Dental Research.

Parenthetically, it should be noted that the calculations which I shall present are based on information relating to approved applications which have survived a thorough evaluation and screening process and have been found to be deserving of support. On an average, only about 40 per cent of the applications are approved by the Institute's study section and advisory council for recommendation for support.

With a view to fiscal 1959, a careful study of experience and data compiled by the American Dental Association indicates that the situation will be very acute unless the budget is increased as proposed by the Association. This arises in large part from the fact that ordinarily it is necessary to consider proposed research projects in terms of three to five years' duration. Very few worthwhile investigations can be completed in the space of one or two years.

Please bear in mind also that a large fraction of the grants to support presently active projects were made in fiscal 1957 or fiscal 1958 owing to lack of adequate funds in preceding years. Thus it is obvious that a very large proportion of the fiscal 1959 funds for extramural projects would be required merely to continue the investigations which are now in progress.

From available data, it is conservatively estimated that about $2,500,000 of the $2,825,000 proposed for project grants will be required in fiscal 1959 for continuation of existing research. That would leave no more than $300,000 to $400,000 available to activate important new studies throughout the entire year. The inadequacy of that amount is emphasized by the fact that before the end of the present fiscal year some 75 to 85 projects, representing a need for about $800,000 will have been approved by the dental advisory council but not paid because of lack of funds. In other words, the backlog of approved grants carried over into fiscal 1959 would be $400,000 to $500,000 greater than the available funds even before considering applications approved throughout that year. Practically it means that if funds are kept at the 1958 level, the program will not only not progress during 1959 but a large amount of effort and careful planning in fiscal 1958 will have been wasted.

Using experience as a guide, if 1959 expenditures are held to the 1958 level, one can readily see that it will be necessary in 1960 to ask for a large jump in appropriations for research projects. In the meantime, there will be waste and inefficiency caused by inability to make adequate plans and failure to use and retain personnel and facilities as they are available. The Association believes that this "jump - level-off" approach is undesirable and works unnecessary hardships on everyone concerned. It would be preferable to make year-to-year increases of the amounts which are necessary to insure a steady progression.

In this connection, another important fact should be considered. Through the fellowship and training grant programs, the schools are now turning out a number of highly skilled research investigators. If we are to take full advantage of this newly acquired and valuable reservoir of scientists, we cannot have a break of a year or so during which the initiation of new projects is sharply curtailed. If that occurs, many of these people will be lost permanently to the dental research effort. This should not be allowed to happen. It can be avoided by a reasonable expansion of support for the Dental Institute's grant program.

To sum up, based upon the amount of commitments for research projects currently underway, the number of worthy projects which have been approved but not activated for lack of funds, and a reliable estimate of the number of applications for deserving projects which will be submitted in fiscal 1959, the American Dental Association believes that an increase of $1,000,000 for the Dental Institute grant program is necessary to keep the

total research effort at a reasonably sound rate of progression.

I assure the committee that if this recommendation for an increase in funds for research projects is granted, it will be money well spent. I believe you will agree that the funds heretofore invested by the government in the dental research program are paying and will continue to pay rich dividends.

In behalf of the American Dental Association, I thank the committee for the opportunity of presenting this testimony.

APPENDIX I
ASSOCIATION POLICY RECOMMENDATION REGARDING NIDR RESEARCH GRANTS

The following policy recommendation on fiscal 1959 appropriations for National Institute of Dental Research research grants was adopted by the American Dental Association's House of Delegates in 1957.

"WHEREAS, the expansion of dental research during the past years bears out the American Dental Association's estimation of the research needs of the nation, and demonstrates that the potential in this area of investigation is not being adequately utilized, and

"WHEREAS, more and more recently graduated dentists and students in the basic sciences are considering the advantages of a career in research and teaching, and

"WHEREAS, it is now time to recognize the essentiality of implementing a long-range plan for developing research on the complex diseases and conditions of the mouth, including their relationship to systemic conditions, and to utilize the combined and coordinated knowledge and skills of many scientific disciplines, and

"WHEREAS, because of a lack of funds it will not be possible to activate many worthwhile research projects and encourage young scientists to enter the field of dental research, therefore, be it

"RESOLVED, that the Congress be asked by the Association to augment the present research grants and training programs of the National Institute of Dental Research by increasing the annual appropriation by $1,000,000."

APPENDIX II
IMPORTANT RECENT DEVELOPMENTS IN DENTAL RESEARCH

CHEMICAL REMINERALIZATION OF DECAYED TEETH

For many years it has been an axiom in the medical profession that certain types of neural or brain tissues do not have the capacity of repairing themselves and that once this type of tissue suffers an injury, the action is irreversible and the patient must bear the effects for the balance of his life.

For generations, a similar axiom has been accepted in the dental profession: that the hard tissues of the teeth cannot repair themselves after injury and the defect can be corrected only by the manual intervention of dentists.

There is some reason to believe that defects in the substance of a tooth—dental decay—might be controlled by "remineralization" of the tooth: the restoring of the decayed or missing portion of the tooth through complex chemical and other procedures. Such procedures might never proceed to the restoration of a tooth to its white, ivory-like integrity. But it is possible to envision that dental research could develop a process under which "remineralization" might halt the decay process and permit the patient to live with some forms of dental decay in comfort and without menace to his total dental health and general health. If research could develop this to the point of usefulness, it would provide, with fluoridation, the major answers to the problem of tooth decay, a disease which attacks the population almost universally. In this one narrow but important area of dental research, may lie the answer to a disease which has not been conquered even in this age of atomic progress.

Important work on this problem has been done in Scandinavia by Andresen and is now

being conducted by Sognnaes at Harvard University. If this search were expanded, its cost would be nominal and, if successful, its results would need to be measured not only in terms of millions of dollars of savings in the cost of dental health but in an unassessable amount of millions in human health and well-being.

TOOTH BANKS

Dentistry today functions on the principle that every single tooth in the arch is important and that the primary aim of the dentist is to save the diseased tooth at all costs. Everyone who has had the misfortune to lose a tooth or to lose several teeth is well aware of the fact that there is nothing like one's own teeth. Replacement of lost teeth has developed to a fine art, but the finest restorations, the most perfect creations of present dental science, dental craft and dental art, are only substitutes for the sound natural dentition with which the more fortunate of us are blessed. For that reason, a tooth is never extracted unless all remedies fail. If the vital pulp of the tooth is diseased, it is treated with medication or by exacting surgery. If in spite of all efforts the pulp is lost, the pulp canal is cleaned and filled with inert material so that the tooth may be retained in the mouth to provide many more years of useful service.

If the tooth itself must be extracted, the dentist regards the situation as a battle that has been lost.

The loss of a tooth must be compensated for quickly by the placement of a bridge or partial denture to fill the gap (literally) and prevent adjacent teeth from loosening, drifting and becoming additional casualties. This procedure has helped thousands of patients immeasurably over the years, but the substituted artificial tooth cannot serve as well as the original because it has no root of its own and must depend for support on the root structures of its adjacent neighbors.

For some years, limited experimentation has been performed with the germs or buds of unerupted teeth. Fleming at Yale, Lefkowitz at Ohio State and others elsewhere have laid the groundwork in laboratory studies in this area. It has been possible to transplant living tooth buds from one site to another within the same animal. Elsewhere, cases are recorded of transplanting wisdom teeth to the first molar area in human subjects. It is possible that transplantation of tooth buds from one animal to another may break ground for the development of "tooth banks" for human teeth. Blood banks, eye banks, bone banks and other similar tissue repositories are serving amazing functions every day. The availability of a tooth bank certainly would be a boon to the unfortunate child whose front teeth are destroyed in an accident, to the young woman whose prospects for future happiness are placed at risk by the necessity of losing all of her hopelessly decayed anterior teeth, to the older individual whose upper fixed bridgework must go because the single remaining tooth on which it depends has finally broken down under the strain.

The day when tooth banks become a reality can be hastened only by the provision of funds for expansion of research in this area.

CRIPPLING ORAL DEFORMITIES: CLEFT PALATE

The condition known as cleft palate affects thousands of American children. The incidence of the deformity is about one of every 750 live births.

Everyone is familiar with the tragic spectacle of a person afflicted with cleft palate: the facial disfiguration, the abnormal speech, the malocclusion of teeth, the near inability to chew or perform any of the normal functions of the mouth.

For many years, science has been working to produce new surgical technics, improved prosthetic appliances, new methods of speech therapy and many other treatments to reduce or eliminate the disabilities associated with cleft palate. Recently, through expanded research, the progress in this area has been greatly accelerated. For example, through use of a newly developed speech bulb placed in perfect position by use of cineradiographic technic, it may bring the day closer when cleft palate patients can achieve normal articulation and voice quality. Advances which are being made in tooth bud transplantation also may be of enormous value in restoring normal function to the mouth of the cleft palate patient.

This extremely promising work on improved treatment for the victims of cleft palate is, of course, continuing. But, even more dramatic and encouraging weapons against this affliction are on the horizon in the field of preventive research.

There are signs that we are on the threshold of discoveries which may make possible prebirth detection and prevention of cleft palate.

A large step toward this accomplishment is in progress at the dental research department at the University of North Carolina where a strain of cleft palate dogs is being developed. This colony of dogs will permit investigation not only of hereditary relationships in cleft palate but also effects of nutritional and other factors in causation and possibly prevention

of the deformity *in utero*. Other significant research on cleft palate is being done by Pruzansky at Illinois, Cooper at the Lancaster, Pa., Cleft Palate Clinic, and elsewhere. More is needed.

PERIODONTAL DISEASE

After the age of 35, the greatest single cause of tooth loss is periodontal disease, or "pyorrhea" as it is commonly but incorrectly known. Although commendable strides have been made in the treatment of periodontal disease, relatively little fundamental progress has been possible because the basic causes of the disease do not lend themselves readily to investigation. The disease is associated with the formation of calculus, or "tartar" on the teeth, with subsequent inflammation and loss of the bony support around the tooth roots. The teeth become loose and eventually fall out. To make matters worse, the ridges that remain are so badly depleted of their bony understructure that artificial dentures often cannot be fitted properly after the teeth have been lost. Everyone knows some unfortunate individual who cannot get an upper denture to stay in place. No dentist can fabricate a stable prosthetic appliance for a jaw that provides no stable foundation. Such are the sad results of advanced periodontal disease.

Within recent years, Leung at Pittsburgh and others elsewhere have made significant progress in elucidating the manner in which calculus is formed. It is recognized that bacteria play an important part in this and later stages of the development of periodontal disease. Exactly what part they play, and how they may be attacked is not yet known.

Two exceptionally promising research tools have come to light through diligent investigation up to now. First, periodontal lesions can be produced in animals by experimental technics. Collings at Baylor and Wentz at Loyola in Chicago have made some of the more recent contributions in this field. Experimental periodontitis can now be studied in the dog and means for preventing the disease can be tested under critical laboratory conditions. The pursuit of this work demands immediate and substantial support.

Second, the bacterial factors can now be studied in germ-free animals—animals that are grown from birth in a sterile atmosphere under conditions that meticulously exclude bacteria and infectious agents of all kinds. Here, then, is the great opportunity to see at last whether experimental periodontitis can be produced in these animals in the absence of bacteria. Here is the chance to introduce bacteria from diseased human mouths to study which of them may cause periodontal disease to develop. And here is the opportunity to introduce antibacterial, anti-inflammatory and other chemical agents and therapeutic technics to see how to arrest the disease process under conditions which permit detailed observations, exact measurement and freedom from the many variables that for years have complicated investigations of the disease in the human mouth.

COUNCIL ON DENTAL TRADE AND LABORATORY RELATIONS

The Independent Dental Laboratories Association (an Illinois corporation)

The Council has received several inquiries from dentists and dental laboratory personnel regarding the activities of an organization calling itself "The Independent Dental Laboratories Association," which during 1957 launched a campaign to organize all dental laboratory owners and workers who deal directly with the public and openly solicit business from the public, or are desirous of doing so. The Council believes that many dentists may have received similar inquiries from dental laboratory owners and technicians. Information on the corporate organization and purpose of this organization, its recent activities, and on the members of the initial and 1957 board of directors of this organization will be presented in this report.

The Independent Dental Laboratories Association was incorporated under the Illinois General Not for Profit Corporation Act in December, 1950. The incorporation of the Independent Dental Laboratories Association coincides approximately with the initiation of litigation in the Superior Court of Cook County, Ill., by the Chicago Dental Society against 34 Chicago area dental laboratories. This litigation ultimately was brought to a successful conclusion with the issuance of a permanent injunction against all of the defendant laboratories which were in business when the decree was entered, prohibiting them from dealing directly with the public and prohibiting advertising in violation of the Illinois Dental Practice Act. In an impressive opinion entitled *People ex rel Chicago Dental Society v. A. A. A. Dental Laboratories, Inc.* 8 Ill. 2d 330, 134 N.E. 2d 285, the Supreme Court of Illinois on March 22, 1956, sustained the issuance of an injunction against the defendant laboratories and swept aside the contention that certain sections of the Illinois Dental Practice Act are unconstitutional.

The Illinois Supreme Court said in part:

> Defendants' principal contention is that the statute deprives them of due process of law under the State and Federal constitutions. Voluminous testimony establishes beyond doubt that the furnishing of artificial dentures is intimately related to the general health of the patient, and that the mechanical work of making the denture is but a small part of the total undertaking, which always requires biological, physiological and pathological knowledge, and sometimes surgical skill. . . .
>
> The aim of the statute is to restrict the practice of dentistry to licensed dentists with the exception that extra-oral work on dental appliances may be done by nondentists who are engaged or employed by dentists to do it. To that end, dental technicians are prohibited to do work on dental appliances directly for the public. The evidence establishes that the knowledge and skill of the dentist is necessary in the diagnosis of the case, the taking of impressions, the issuance of instructions to the laboratory and the testing, fitting and adjustment of a prosthetic denture.

On October 15, 1956, the Supreme Court of the United States dismissed the appeal of the defendant laboratories from the decision of the Supreme Court of Illinois "for want of a substantial federal question" (*A. A. A. Dental Laboratories, Inc. v. People of the State of Illinois ex rel Chicago Dental Society*, 352 U. S. 863, rehearing denied, November 19, 1956, 352 U. S. 919.).

The corporate purpose recited in the Independent Dental Laboratories Association Articles of Incorporation is:

> . . . to establish an association of owners and operators of dental laboratories in Illinois for their mutual benefit and improvement; to promote the public welfare by promoting, improving and making uniform and certain through the development and interchange of information, procedures, practices and otherwise, the standards, ethics, usages and practices of the trade and its members; to engage in educational, charitable and literary work.

RECENT ACTIVITIES

Early in December, 1957, the Independent Dental Laboratories Association addressed a letter to many members of the dental laboratory craft soliciting membership in the Independent Dental Laboratories Association. The December letter urges "denturists" to organize "on a national level if we are to survive as a profession" and "before we are all entirely under the thumb."

The word "denturist" is thus used by these laboratory workers to identify themselves. The word is not found in any standard dictionary. In proposed legislation sponsored by this group in the 1957 session of the Illinois legislature, in an attempt to legalize their activities, the term "denturist" was defined as follows:

> "Public Denturist" means a person not licensed under the Laws of the State of Illinois to practice medicine or to practice dentistry who engages in the practice in the State of Illinois of any or all of the following practices directly for the user, wearer, or prospective user or wearer, with right to offer and solicit, and without the necessity of a prescription or

order of any person licensed to practice medicine or to practice dentistry:

1. The manufacture, construction, and supply of any removable prosthetic denture appliance which will not become a stationary and permanent part of ones natural teeth, and to offer and solicit so to do;

2. The repair, replacement, reproduction, duplication, and supply of broken or missing parts of prosthetic removable denture appliances, and to offer and solicit so to do.

In a pamphlet entitled "It's The Public That Pays" distributed by the Independent Dental Laboratories Association in 1957, it was stated:

"Denturist" defines the thoroughly-trained professional designer and maker of dental plates and related prosthetic devices. His training and experience includes all the skills of the dental laboratory technician. In addition—and unlike the laboratory technician—the Denturist is a recognized specialist, usually with his own laboratory and technicians, who maintains direct association with the consumer—that is, with the wearer and user of dental plates or other prosthetic devices.

By definition the "denturist" thus is one dealing directly with the public, and not with a licensed dentist. By his own definition, a "denturist" is a law-violator in those states which prohibit a laboratory worker from dealing with the public. It is clear that the purpose of the "denturists" is to develop support for the excision of oral prosthesis from the traditional concept of professional dental practice. The purpose of these unlicensed persons to deal directly with patients is made abundantly clear by certain language in the pamphlet already mentioned entitled "It's The Public That Pays":

By serving the public directly, the Denturist is able to provide better service, better fit, faster delivery and much lower costs on dentures and denture repairs.

* * * *

Recognition BY STATUTE of the Denturist's independent services, would mean substantial savings not only to individual wearers of dentures, but to the general tax-paying public, as well.

A pamphlet enclosed with the December, 1957, solicitation letter offers a membership program as an inducement to membership.

Although glowing promises have been made to prospective members of the Independent Dental Laboratories Association with respect to program and action in their behalf, including a "National Conference" in the Spring of 1958, applicants are being informed that ". . . we will not issue anything further until all applications are in from the current campaign. . . ."

INITIAL AND 1957 DIRECTORS

The members of the initial Independent Dental Laboratories Association board of directors were:

Martin Clyde
Lester Sutker
Lawrence L. Juliano
Maurice Mendell
T. P. Duncan

Mr. Martin Clyde, doing business in Chicago as Tru-Tone Dental Plate Laboratory or Tru-Tone Dental Laboratory, was a defendant in the Chicago Dental Society injunction proceeding referred to earlier. He was also owner and operator of a mail order denture business under the name "Tru-Grip Dental Laboratory." On March 22, 1954, Mr. Clyde was convicted in the County Court of Cook County, Ill., of owning and operating a place of business where dental operations were being performed and of practicing dentistry without a license. The court found he had attempted to extract a lower molar of a customer. The tooth broke off and he finally sent the victim to a licensed dentist. Mr. Clyde was fined $200 for owning and operating the business and sentenced to County Jail for 60 days and fined $300 for attempting the extraction. He appealed the case and died of a heart attack before the appeal was heard.

Recently a consent decree was entered by the Superior Court of Cook County

against Mary Clyde and Beldon Clyde, the wife and son, respectively, of Martin Clyde and apparently the successors to his interest in the Tru-Tone Dental Laboratory. Mary Clyde and Beldon Clyde are now (March 1958) under indictment in the U.S. District Court in Chicago, charged with violations of the Federal Denture Act.

Mr. Martin Clyde was the initial registered agent for the Independent Dental Laboratories Association. Although Mr. Clyde died several years ago, the Independent Dental Laboratories Association continues to report him as its registered agent in the 1957 annual report of the corporation to the Illinois Secretary of State.

Mr. Lester Sutker was also a defendant, doing business as Allied Dental Reliner Co., in the Chicago Dental Society litigation. When Mr. Sutker testified in that case, he stated that he was secretary of the Independent Dental Laboratories Association. He admitted doing repair work, relining, and duplications directly for the public, but denied that he or any of his employees took impressions. He specifically denied the testimony of two customer witnesses. As to this, the Master In Chancery who heard the testimony said in his report to the Superior Court of Cook County that Mr. Sutker's explanation was "not credible." The Master's report was approved by the court and in the final decree Mr. Sutker was permanently enjoined from practicing dentistry without a license.

Mr. Lawrence L. Juliano was also named as a defendant, doing business as Best Dental Laboratories at two locations in Chicago, in the Chicago Dental Society litigation. When called as a witness he refused to testify on the ground that his testimony might incriminate him. Subsequently, Mr. Juliano was committed, under the name "Lawrence Guiliano," to the Elgin State Hospital as a mentally ill person. He was later dismissed from the Chicago Dental Society case.

At the time of the Chicago Dental Society litigation, Mr. Maurice Mendell owned extensive interests in the dental laboratory business. Several companies in which he or members of his family owned a majority of the stock were defendants in the Chicago Dental Society injunction suit. They were: A-1 Dental Plate Laboratory Company, Inc., Cleveland Dental Plate Laboratory, Inc., Duncan Dental Laboratory Corporation, Comfort Dental Plate Laboratory Company, Inc., and State Dental Plate Laboratory, Inc. All of these laboratory companies were found guilty of practicing dentistry without a license and were enjoined by the court. Although Mr. Mendell is a director of the Independent Dental Laboratories Association, he did not claim in his testimony to be a dental laboratory technician or claim to have done actual laboratory work. In testifying about his early experience in the dental laboratory field, he said, "I made it my business to go round and sort of recognize plates."

Mr. T. P. Duncan was also a defendant in the Chicago Dental Society litigation. He sold the Duncan Dental Laboratory business to Mr. Mendell during the pendency of the Chicago Dental Society injunction case.

In the 1957 annual report of the Independent Dental Laboratories Association, the following were listed as directors:

Maurice Mendell
T. P. Duncan
Jerome Getsla
Maxwell E. Potts

Information has been furnished on Messrs. Mendell and Duncan. Mr. Jerome Getsla is now (March 1958) under indictment in the U.S. District Court in Chicago, charged with violations of the Federal Denture Act. Mr. Maxwell E. Potts was one of the spokesmen supporting the 1957 "public denturist bill" at the hearing conducted by the Committee on License and Miscellany of the Illinois

Legislature, which bill was overwhelmingly defeated.

COMMENT

The Independent Dental Laboratories Association is not affiliated with the National Association of Dental Laboratories and also should not be confused with the Illinois Dental Laboratory Association.

At its 1957 meeting, the house of delegates of the National Association of Dental Laboratories adopted the following policy statement on the activities of the public denturist group:

. . . we of the N.A.D.L. state that we disapprove any group or groups that support Public Denturist Legislation, for the reason that we feel our services are restricted for the licensed dentist . . .

The Council wishes to take this opportunity to bring again to the attention of dentists everywhere the following excerpt from the report of the Reference Committee on Dental Trade and Laboratory Relations to the 1957 House of Delegates of the American Dental Association:

. . . that since the dental laboratory technician and the dental laboratory have an adjunctive relationship to the dental profession, a heavy responsibility is placed on the dental profession to do all it can to see that this relationship is maintained on a high ethical level. . . . It is important for every dentist to be aware of his own responsibility in this area and to be familiar with the laws and the principle which govern the ethical laboratories and with those which control his relationship to them.

In response to the recommendation of the Reference Committee and the supporting resolution of the House of Delegates, an *A.D.A. Information Bulletin* on "The Dentist's Relations with the Laboratory Craft—A Review of His Legal and Ethical Responsibilities" was distributed in mid-December, 1957, to every member of the Association. Additional copies of the *Information Bulletin* may be obtained from the Council on Dental Trade and Laboratory Relations.

BUREAU OF LIBRARY AND INDEXING SERVICE

Additions to the Library

The books listed here have been added recently to the Library collection. Requests for this material, available on loan to all members of the Association, should be addressed to the Bureau of Library and Indexing Service. There is no charge for borrowing these books. Most of these books may be purchased also through the Bureau. In addition practically all the dental journals published in the world at present are available to members on loan.

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BUREAU OF ECONOMIC RESEARCH AND STATISTICS

A motivational study of dental care

This is the third installment of a pilot motivational research study conducted for the American Dental Association by Social Research, Inc. The first two installments, which appeared in March and April, dealt with the methodology of the study, basic concepts pertaining to the teeth, social class and its relationship to dental beliefs and practices, and dental aspects of childhood. This installment explains the feeling of inevitability and resignation most people have about dental decay, as well as the compensations of dental disease and dentures. This series will be concluded next month.

IV. ADULTS AND DENTAL NEGLECT

In addition to social class and early childhood considerations, this pilot inquiry finds several specific attitudes which seemingly work against increased public concern with dental care. To some extent, these have been alluded to in previous sections of this report; in this chapter they are discussed in a more direct fashion.

1. Heredity, Luck, and Diet Are Thought of as Determining Factors in Dental Health • In spite of the well-known and oft-repeated maxims that the way to have healthy teeth is to "brush them twice a day and see your dentist twice a year," there are many reservations people have about the possibility of reducing dental trouble. In this sense, people pay lip service to proper dental care as a preventive measure, but do not actually believe that even tremendous amounts of personal and even professional care will make them immune from dental decay or loss. Social class considerations are important in this connection, with the lower class groups being more inclined to believe that little if anything can be done to save the teeth; but to at least some degree all people have the feeling that dental care itself does not determine the health of one's teeth.

The most widely held notion is that "people are born with either good or bad teeth—and there's nothing much you can do about it."

> Some people have teeth that are harder. Some people have naturally softer teeth—they break down faster.
>
> (LM, 17, Boy)

> Some people just have what you call soft teeth. When Jeannie [daughter] was only 12 we had a partial plate made for her. It wasn't enough that she kept her teeth clean; she just didn't have enough calcium in the system, you know—not enough of this and that.
>
> (UL, 53, Woman)

> There are some people whose system is such that they naturally have bad teeth. They have a lot of acid in their systems that works on their teeth. They usually have nervous dispositions or are irritable.
>
> (UL, 55, Woman)

> I don't know why people have trouble with their teeth—it's just the inherited characteristics of the teeth. I presume that people that have trouble with their teeth have not had good dental care.
>
> (UM, 45, Man)

> Oh, I think it is a lot in the make-up of people. I have found out that the softness of your teeth and everything seems to be kind of hereditary. Now, I've got a sister, her husband's teeth have been bad all his life, and her two children—one is 18 and one is 21—

both have bad teeth. She's spent thousands and thousands of dollars on them.

(LM, 47, Woman)

It will be noted from these quotations that the higher status people are inclined to combine heredity with other considerations in an attempt to account for dental trouble, though heredity often is the dominant factor according to their interpretations. Heredity, of course, is felt to be a cause which the individual can do little about: it is beyond his power to deal with, something that is bestowed upon him without his knowledge or desire and which must be accepted as best one can. And whether true or not, this view implies that little if anything can be done: at best, dental trouble can only be delayed or deferred.

Closely related is the oft expressed idea that dental decay is related to poor diet.

It's probably that people don't watch their diet. My dentist said that, with teen-agers especially. A deficiency in diet is the greatest reason.

(LM, 31, Woman)

Some trouble is due to—well, some people just naturally have better teeth. Maybe diet has something to do with it. Some don't give their teeth any more care than others and yet still have less trouble.

(LM, 36, Man)

Especially revealing is the feeling that the dietary causes for poor teeth begin at an early age—when the child does not decide for himself what is proper food for building strong, healthy teeth. The responsibility for dental trouble is thus attributed to the parent, to poor economic conditions, to a lack of knowledge as to what foods should have been served, and the like. In all of these conditions there is the tacit notion that people who suffer from dental trouble can do little about it—it is too late or "out of their hands." An extreme statement of this sort involves the mother's prenatal diet, when the individual had no control over what was eaten by the mother.

I think the mother's prenatal diet and condition has a great deal to do with your teeth. Susie has had bad teeth and her oldest brother had horrible teeth, and her mother had to have false teeth when she was 25.

(UM, 16, Girl)

Effective dental education must counter these views, for they express the feeling that dental care is quite secondary to uncontrollable forces and conditions. In effect, it absolves the individual, gives much emphasis to luck and fate, and implies that even the most meticulous person who has "soft teeth" (as respondents express it) cannot hope for more than a lifetime of cavities and extractions, whereas someone with "hard teeth" need not do anything to or with his teeth and yet not be afraid that he will ever have trouble with them.

2. *Dental Trouble Is Inevitable* • Another factor which works against increased efforts to care for teeth is the feeling that dental trouble—cavities and loss—is inevitable. This is not directly stated, but is implicit at many points of the interviews. Consider, for example, the following remarks by a lower class woman:

My teeth started going bad when I was just a little kid. When one would ache and it wouldn't stop with toothache medicine, I'd go get it pulled out. I never did have any filled. The doctor said they were too soft and too bad . . . No, I didn't take much care of my teeth.

(LL, 37, Woman)

In her mind it would appear that inevitably teeth get bad. When they do not respond to medication—and probably most often they do not, according to her views and experiences—they have to be pulled. And eventually all of them have to come out. This mental scheme is expressed most directly by lower class individuals, but in some ways it is involved in the thinking of all people.

A prime reason for this is that teeth are intimately associated with the aging

process. It is likely that people not only believe that you can tell a horse's age by his teeth; more relevant, is that you can tell a person's age by the condition of his teeth. Tables 3 (Chapter 1) and 4 (Chapter 3) give some indication of this: teeth look and feel different at various stages of a person's life. Moreover, there is the assumption that throughout life teeth undergo change, and the direction of this change is that of gradual and progressive decay. It is in this sense that teeth are an excellent symbol of life itself. Beginning with a state of dependence, as exemplified by the lack of teeth in the infant and his relationship with his environment, the appearance of teeth symbolizes the growing and maturing process. At the "height" of this process man is (and teeth are) strong, healthy, independent, vigorous. And then begins the inevitable decline we call aging: the "loss" of strength, the appearance of physical ailments and pains, the "decay" of different bodily organs, ultimately leading to a state of dependence (as exemplified by no teeth) and death.

Feelings people have about aging come forth in relation to their teeth. For example, the realization that a tooth has to be pulled is often countered with protest and then acceptance and resignation.

> Most people seem to think having false teeth is the worst thing that can happen to them, otherwise they wouldn't put it off so long. I guess too they think it makes them feel old. Well, I listened to what my dentist told me—put them in and leave them in even to sleep and not to eat with them until he told me to—that was about a month. I took mine out at meal time—your mouth muscles have to drop. My mouth felt awfully full when I first got my teeth. There are still some things I can't eat. Sometimes false teeth are too white and in talking you can tell, speech isn't clear or you whistle when talking.
>
> (UL, 48, Woman)

The concepts of age and aging mean different things to different people, and the social class variable is of great importance here. The middle class individual, who has the means, outlook, and willingness to fight a strenuous battle against getting old, delays this period of life until his sixties. He acts, dresses, and comports himself in ways that are youthful for as long as possible; he gives himself a type of care, makes use of his physical environment, and conceives of himself in such a way that youthfulness and its many associated qualities are retained for a larger proportion of his life span. In the area of dental care he is inclined to value his own, natural teeth and to keep them for as long as possible. To this end he will seek all types of medical and dental care and make use of a variety of different dental products.

In contrast, the lower class person thinks of the prime of life as occurring at a much earlier age—adolescence and the early twenties. It is by no means unusual for a lower class woman of 30 to think of herself as "old." She has already had all or most of her children, is confronted with a hard work day, feels tired out, is faced with various kinds of physical ailments. She is not accustomed to think of preventive dentistry, and the loss of teeth for her is likely to be accepted as one of the facts of life—a confirmation of her age.

It is important to note, however, that for all people dental problems and ultimate dental loss is regarded as inevitable, and because it is associated with the aging process this makes it all the more convincing. This conception works against people's understanding of and interest in preventive dentistry. It implies that decay and the loss of teeth is a natural process—as is age itself—and that while it can humanly be dealt with to some degree, it must come. Some people actively seek to delay the inevitable, others accept it with considerable resignation, and a few seek it out—as if to get the worst over as quickly as possible.

3. "Dental Care" Is Defined in a Limiting Way • Another factor which works

against increased concern with dental care is that, over-all, people have a rather restricted view of what this entails. As previously noted, "brushing is the thing;" this is generally considered the main type of care one can give to his teeth. By implication, diet too is thought of as important—but more frequently than not this facet of care is surrounded by notions of "it's too late," that if a proper diet was not had in the early, formative years, little can now be done to prevent the onset of decay.

The research suggests that to at least some extent "dental care" has been overly defined as brushing the teeth. Further, it suggests that brushing has been overly defined as a duty performed for future, rather than present, pleasures, rewards, and gratifications.

Brushing is the one means by which people feel that they can deal with their teeth. From the way in which brushing is talked about, in contrast to the manner in which other types of self-care are spoken of, it is likely that it is less sensually and tactually gratifying. The bath is associated with warmth, pleasant aromas, the freedom to "caress" and handle oneself. The shave has its soaps, lotions, hot towels, and the opportunity to look at oneself in the mirror in an examining and admiring way. Feminine cosmetics, creams, and lotions are delicately and soothingly applied in a self-indulgent manner.

By contrast, brushing the teeth is a somewhat stark and uninviting business. The brush is hard (we note that people do not like to be told they should use a soft brush—in this one area they want to feel very assertive); the dentifrices, even when well flavored are much unlike what one usually puts in the mouth. Brushing is considered a business and a duty that should be carried out routinely and sensibly, and is not really supposed to be enjoyable lest this imply you may not be doing it thoroughly enough. For those to whom cleanliness is accompanied with feelings of pleasure, this is reward enough. But for most people cleanliness is more a duty than much else, and we are inclined to believe that most people derive a sense of satisfaction in this area mainly from having done what is right. (This is a more powerful motive for the moral middle class group than for upper lower class people who tend to defy authority, routines, and controls.) Any "softening up" of the dental care process tends to be resisted: even mouthwashes, which could act as a kind of after-reward, do not seem compatible with it. Picking, brushing hard, massaging with hard rubber, and the use of cutting flosses all seem much more in line, and no matter how routine the performance is, there is always a lurking suspicion that one is not being sufficiently attentive.

> I don't scrub them like I should, guess I am away too much.
>
> (LM, 50, Man)

> My brother and I always liked to brush our teeth. I always liked to do it. It was fun until I found out I couldn't play around at it.
>
> (UM, 16, Girl)

It is difficult to ascertain accurately how often any given respondent brushes his or her teeth; though once a day at least seems to be a general kind of rule and some report that they brush as often as three or four times a day. There might well be some exaggeration in these estimates, especially as one goes down the social class scale; and it is likely that even in the middle status groups, forgetfulness is very easy.

We also note in this connection that people seem to feel they get little guidance about the proper tools to utilize when brushing—as if to say (and perhaps to complain a bit, realistically or not) that dentists and product commercials have not given suitable rationales for selecting one product or the other. There is a tendency to be more comfortable using dentifrices and brushes to which one is accustomed and to believe that

there is little difference between these products. (Yet people do have preferences, and their selections, we must assume, are based on considerations important to them.)

As for particular products used by our sample (a topic about which this survey got only a limited amount of information), we find that paste appears to be more popular than powders, rinses not used very often, flosses seldom used by respondents. Over-all, buying seems to be impulsive or compulsive, not based on much knowledge of or confidence in the products involved—but on this point our data are extremely scant. In many families, the housewife buys the dentifrices and the husband goes along with what is in the cabinet: he is not inclined to have any strong favorites. Children probably exert a greater influence, especially in middle class homes, but even stronger reasons for choice are prices, sales, pleasant flavors, and the like.

4. Dental Trouble Is a Source of Sympathy • We find that there is little social stigma attached to tooth difficulties. Although good looking teeth are considered a social asset, and people might be repulsed to see someone with discolored, dirty, crooked, or knocked out teeth, there is also an understanding and tolerance of various types of dental defects. The underlying attitude seems to be that whereas some people might be more inclined to have dental problems (lower status, older, careless people, for example), there also is the feeling that it could happen to almost anyone and will, sooner or later.

In this sense dental problems elicit the understanding of others, and from the way in which some people talk about trouble they have with their teeth, it is likely that they use this physical disability as a means of evoking the sympathy of others. This is especially apparent among teen-agers, who are inclined to be self-conscious about their appearance at this age, and among older people who are about to have or recently have had their teeth extracted.

> My teeth were so crooked and stuck out in front so bad that I was anxious to get them straight. I kind of wondered how the dentist would do the work, and I asked kids who had worn braces if they hurt. They told me they didn't hurt. I didn't care how they looked because I knew I wouldn't look any worse than I already was. Ugh. My teeth were a mess. I was glad to get them straightened. No one pays any attention to my braces now. At first the kids just said, "I see you got your braces on," or "Do they hurt any?" Just things like that. [What kind of kids generally seem to have to wear braces?] Just ordinary kids like me. Not too many kids I know have braces. I know Don Smith used to wear braces but not now. He looked O.K.; he's nice looking anyway. None of the poorer kids seem to wear braces.
>
> (LM, 15, Girl)

The remarks quoted also focus on another aspect of attitudes toward dental problems and care; namely, that trouble with one's teeth and related corrective measures are felt to communicate to other people some desirable characteristics about the individual. By no means are our data or understanding complete on this point, but there are suggestions that people (in some ways) think of dental trouble in connection with "finer," more socially prestigeful qualities. This requires further definition and investigation, but it appears to be related to the more general notion that personal fragility and delicacy tend to be equated with such traits as sensitivity, perceptiveness, intelligence, social graces. Our culture and traditions emphasize that rich people are more inclined to suffer from illness than are the lower status, poor classes.

Dental trouble seems to fit this scheme, too. Some people appear to take pride in the fact that they have soft teeth which require a lot of dental attention, or crooked teeth which require straightening, or teeth which readily chip or break. This same type of feeling is also associated with different types of dental care—

braces, fillings, gold capped teeth, dentures, and so on. As suggested in Tables 2 and 3 (Chapter 1), certain types of repaired teeth are more apt to be thought of in connection with higher status people, the successful business executive or the white collar salesman. The full meaning of these ideas and feelings is not clear from the present investigation, but it does seem likely that these associations to at least some extent support (or help rationalize) poor or negligent dental practices among some portions of the population.

5. "Dentists Fix Your Teeth" and "False Teeth Aren't So Bad Anyway" • Throughout the materials collected for this study there are direct and indirect references to the idea that all dental problems eventually lead to the dentist's office. This is the assumption involved in the "guilt and punishment" drama associated with dental care: "if you don't take care of your teeth they will decay and it will be necessary to have them fixed or pulled out by the dentist." The dentist is the symbol of punishment, and all the threats, fears, and anxieties associated with dental care "predict" the eventuality of going to the dentist to "take the medicine" for dental neglect.

We suggest on the basis of our data, that the scheme backfires for one of several reasons. One is that this end, or punishment, is assumed to occur whether teeth are taken care of or not. This is the implication of the notion that teeth inevitably decay and that the causes of dental trouble are hereditary and dietary, essentially out of the individual's control.

Secondly, dentists are defined as professionals who fix, repair, and correct teeth—either by straightening, capping, filling, or extracting. They solve the individual's dental troubles and problems, and whether this is felt to be a punishment or not, it nevertheless is a solution.

The public image of dentists and the field of dentistry has been greatly modified in the past few decades, so our information suggests. More will be said of this in the following chapter; here it can be pointed out that dentists are increasingly thought to possess skills, methods, and technics which solve dental problems. Perhaps this image is supposed to emphasize the preventive role of the dentist; in effect, it emphasizes for most people what he can do once the trouble is well on its way, when he is not needed to advise, counsel, or prevent, but instead to correct and repair. In terms of these considerations any neglect on the part of the layman can be "fixed up" by the professional—so the incentive to prevent dental decay is not as great as it would be if no remedial action were possible. Social class again makes its appearance in this context—with middle class people wanting to prevent dental trouble more than lower status individuals, regardless of what dentists can do; but the fact that teeth can be corrected by the dentist is meaningful to all people in some fashion.

A third factor is that the "punishment" has some attractive features—or at least, it is not all negative. The implications of having poor teeth that require professional attention have already been referred to. More specifically, we find that the last step in dental trouble—namely, the loss of teeth and their replacement with false teeth—is felt to be an attractive solution in some ways.

> I was scared. I had gone to have a tooth pulled and when the dentist looked at them he said most of them were bad. I had pyorrhea. I had 26 teeth and only five of them were good. I was scared and it was a horror. To think I coundn't eat good again, and I was scared. I went home and talked it over with my husband and he said, "If you have to do it, get them pulled and get it over with." I called the dentist and told him to make an appointment to start pulling them.
>
> (LL, 48, Woman)

> Sometimes it's the dentist's fault that people have trouble with their teeth. He don't advise false teeth in the first place and people worry

along with half shot teeth . . . I don't have any problems now. My only problems before I got false teeth was trying to save my teeth and getting screwed in ones and bridges and crowns and things like that instead of breaking down and getting false teeth to start with. Now I can chew corn on the cob or anything I want to.
(UL, 54, Woman)

Before I got these dentures I had real soft teeth. Most of my teeth had been filled two and three times apiece. When I had them all out I was 26 years old. They were all bad and kept crumbling. I was better off without them.
(LM, 54, Man)

The satisfaction expressed with dentures obviously involves many factors. Some of the more important of these seem to be as follows:

In a psychological sense, the loss of teeth is a sign of atonement. Any evil associated with this organ is dealt with by removing the (infantile) offending part. Symbolically, the mouth once again becomes a dependent, harmless part of the body—the teeth are gone, only the gums and removable dentures remain.

Having the teeth extracted is an effective way of "giving up the ghost." The trouble is removed, entirely and permanently. No longer need the person feel he has to care for his teeth; they have been cared for in a complete and final sense. There is a promise that trouble will never again appear, and any sense of guilt stemming from dental neglect need not concern the individual. There are no teeth to care for.

Further, for people who have had continuous trouble with their teeth there is frequently the feeling that false teeth look better as well as feel better. And, as represented in our sample, there is usually the added notion that "false teeth work just as well as natural teeth."

Again, we must stress that social class considerations make for differences in these attitudes. The higher status person, given his outlook on life, his world, his person, prefers to retain his own, natural teeth—in many instances, regardless of any benefits that might accrue from extraction and replacement. Lower status people exemplify more directly the desire to "get rid of the trouble;" they expect to have dentures and are more willing to accept them.

In any event, this cluster of feelings and attitudes toward dentists and dentures works against increased concern with dental care. Essentially, it avoids many of the issues associated with preventive dentistry, and instead emphasizes how to cope with dental problems once they have made their appearance and require attention. It stresses the fact that the rewards and punishments implicit in dental health and dental neglect are such that they do not succeed in threatening people to take good care of their teeth, for the rewards are remote and difficult to achieve and the punishments are, in the final analysis, not too severe and likely to be received sooner or later.

COUNCIL ON DENTAL RESEARCH

List of certified dental materials revised to April 1, 1958

Because there has been some confusion regarding certified dental materials, the Council on Dental Research presents this summary to clarify the operation of its certification plan.

The first fundamental item in this plan is the existence of official American Dental Association Specifications for Dental Materials. These specifications are the outcome of research by the American Dental Association Research Division at the National Bureau of Standards correlated with the clinical experience of members of the Association.

As the second step in the operation of the plan, the manufacturers are invited to certify to the Council on Dental Research that their products comply with the specifications. It would be manifestly impossible for the Council (through the American Dental Association Research Division at the National Bureau of Standards) to test every lot of every certified material. For this reason, the Council has required that the manufacturer, on certifying a product, not only must guarantee that this product meets specification requirements but also must furnish evidence that he maintains a testing program adequate to insure continual compliance of the product.

On receipt of a certification for a new product with all required data, the Council procures a random sample through regular trade channels, usually by asking a dentist to act as its agent. This sample is tested for compliance with all specification requirements. Only when the certification is complete and in proper form and the sample has passed all specification tests does the Council accept the manufacturer's certification. The name of the product is then added to the list of certified dental materials.

This, however, is not the complete story. The continuation of any product on the list of certified dental materials is contingent on its maintenance at specification quality. Surveys of all products on the list are made at the Council's direction. These surveys are made on samples procured on the open market. Whenever a material fails to comply with the specification requirements, it is removed from the list and the manufacturer is notified that his certification of the product is no longer acceptable. Thus, although the Council cannot test the entire production of dental materials, its certification plan calls for continuous testing by the manufacturer and check tests by the Research Division so that a constantly high level of quality of the products on the list will be maintained. Revisions of the list appear in THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION from time to time.

Lately there have appeared through the mail some advertisements for amalgam alloys, mercuries, zinc phosphate cements and acrylic resins with statements that the manufacturer guarantees them to comply with the specifications of the American Dental Association. An examination of the list of certified dental materials shows that some of the materials that have been so advertised have not been certified by their manufacturers to the Council on Dental Research. The certification program is financed jointly by

federal and American Dental Association funds, and no charge whatsoever is made to the manufacturer. If a manufacturer is regularly testing his material, then the only expense he will have in certifying the material to the Council is the cost of the three cent stamp required for mailing the certificate and data. When a dentist sees a statement such as, "Every batch of this alloy is carefully tested before being released for shipment to be sure that it fully meets A.D.A. specifications," he should be certain to check the list of certified dental materials to see if the product appears there.

In the purchase of certified material for use in dental practice, this list should be used as a buyer's guide. In addition, the package of material received should be checked for its exact name as given in the list and for a statement thereon guaranteeing compliance with the specification. The Council should be notified of any discrepancies.

The materials appearing on this list will produce satisfactory restorations only if used properly. In almost all instances the respective manufacturers' directions should be rigidly adhered to in using a specific material. In other words, the technic of using is as important as the material for the simple reason that an inferior technic will ruin or damage a superior material. Changes, made frequently in this list, are printed in the Reports of Councils and Bureaus section of THE JOURNAL.

CERTIFIED DENTAL AMALGAM ALLOYS

(A.D.A. SPECIFICATION NO. 1, FIRST REVISION)

Alloy	*Manufacturer or distributor*
Abner Fine Cut; Oxford	Abner Alloys Co.
Accurate Metalloy (filings)	The L. D. Caulk Co.
Ames Alloy Quick Setting	The W. V-B. Ames Co.
Argentum "A" cut; fine cut; medium cut	Hammond Dental Mfg. Co.
Aristaloy	Baker & Co., Inc.
Banner (filings)	Goldsmith Bros. Dental Co.
Baring (improved fine cut)	Baring Smelting & Refining Co.
Brewster Medium	Brewster Laboratories
Certified Non Zinc	Lee Smith Co.
Cresilver	Crescent Dental Mfg. Co.
Dee (filings)	Kerr Mfg. Co.
Fellowship	Dental Protective Supply Co.
Filling Alloy, fine grain	Abe Bass
Fleck's	Mizzy, Inc.
Garfield's	Garfield Smelting & Refining Co.
Gem	Certified Dental Supply Corp.
Gold Bond	Jefferson Dental Supply Co.
H & M Special	Hauser and Miller
Linc-Alloy	Lincoln Dental Supply Co.
Lustraloy Regular	Pfingst & Co.
Midvalloy	Midvale Dental Supply Co.
Minimax (filings) 173; 177; 178; 178 non-zinc; 178 fine cut; 183; White Gold & Platinum; (shavings) 177; 178	The Minimax Co.
Mission No. 5; No. 5 "A" Cut	Henry F. Bruce Co.
Modeloy (quick setting filings)	Crescent Dental Mfg. Co.
Mynol Improved	Mynol Chemical Co.

National Dental	Eskay Dental Products
New Deal	Miller Dental Co.
Oceanic Filling Alloy	Oceanic Chemical Co., Inc.
Odontographic "Improved" (filings)	Odontographic Mfg. Co.
Pearlol	Wildberg Bros. Smelting & Refining Co.
Peerless	Herbert D. Damsky
Precision	Precision Bur Co.
Research Oralloy	Precious Metals Research Works, Inc.
Royal Super First Setting	Garhart Dental Specialty Co.
Safco 69	Safco Laboratories
Silver Crown Fast; Medium; Slow; non Zinc; Fine Cut; Fine Cut non Zinc	General Refineries, Inc.
Silverloy (filings); F. C. #20 for Proportioner; (shavings)	Crescent Dental Mfg. Co.
Speyer	Speyer Smelting & Refining Co.
S-C Medium (filings)	Stratford-Cookson Co.
Standard	Standard Dental Products Co.
Stratco	Edward P. Stratt
Tri-Alloy	Tri-Boro Dental Supply Co., Inc.
True Dentalloy (filings); Cut "A"; New	The S. S. White Dental Mfg. Co.
Twentieth Century Regular; Special; Fine Cut; Non Zinc; Micro; Micro Non Zinc (filings and pellets)	The L. D. Caulk Co.
Ultra Brand Improved; Fast Setting; Regular; 72% Silver	H. Jelinek Dental Alloys
White Beauty; Fine Cut	Lang Dental Mfg. Co.
Yates Balanced	J. Yates Dental Mfg. Co.

CERTIFIED DENTAL INLAY CASTING INVESTMENTS

(A.D.A. SPECIFICATION NO. 2)

Investment	*Manufacturer or distributor*
All Purpose, Formula No. 35	The S. S. White Dental Mfg. Co.
Baker Cristobalite	Baker & Co., Inc.
Beauty-Cast	Whip-Mix Corp., Inc.
Cristo-Vest	The Ransom & Randolph Co.
Kerr Cristobalite-Inlay	Kerr Mfg. Co.
Ransom and Randolph Gray	The Ransom & Randolph Co.
Steele's-Super	The Ransom & Randolph Co.
S. S. White Formula 25	The S. S. White Dental Mfg. Co.

CERTIFIED DENTAL IMPRESSION COMPOUNDS

(A.D.A. SPECIFICATION NO. 3, FIRST REVISION)

Compound	*Type*	*Manufacturer or distributor*
Certified	I	Lee Smith Co.
Exact	I	The S. S. White Dental Mfg. Co.
Kerr Perfection; No. 2 Soft Green; Grey; White; Black	I	Kerr Mfg. Co.
Mizzy Low Heat	I	Mizzy, Inc.
S. S. White-Black-Tray	II	The S. S. White Dental Mfg. Co.

CERTIFIED DENTAL INLAY CASTING WAXES

(A.D.A. SPECIFICATION NO. 4, FIRST REVISION)

Wax	*Manufacturer or distributor*
Baker-Blue—Regular medium	Baker & Co., Inc.
Blue Inlay—Hard	The S. S. White Dental Mfg. Co.
Kerr-Blue—Hard	Kerr Mfg. Co.
Security	The Cleveland Dental Mfg. Co.
Taggart's Blue	Mizzy, Inc.

CERTIFIED DENTAL INLAY CASTING GOLD ALLOYS

(A.D.A. SPECIFICATION NO. 5)

TYPE A, SOFT

Alloy	*Manufacturer or distributor*
Aderer-A-Soft	Julius Aderer, Inc.
Baker Inlay Soft	Baker & Co., Inc.
Chilcast No. 1	Vernon-Benshoff Co.
Coe 1	Coe Laboratories, Inc.
Crown Inlay No. 2 Soft; K	General Refineries, Inc.
Deeone	Handy & Harman
GB Inlay No. 1 Soft	Goldsmith Bros. Dental Co.
Jelenko Special Inlay	J. F. Jelenko & Co., Inc.
Leff Light Inlay	Leff Dental Golds
Luft "A"	John Luft Prescription Alloys
Mowrey's S-1; S-M	W. E. Mowrey Co.
Ney-Oro A; AA	The J. M. Ney Co.
Noble No. 1	Noble Metals & Alloys Co.
Research A	Precious Metals Research Works, Inc.
Spyco Soft; Eleven	Spyco Smelting & Refining Co.
S. S. White No. 2; 900 soft; 940 Very Soft	The S. S. White Dental Mfg. Co.
Stern S	I. Stern & Co., Inc.
Wildberg A-2	Wildberg Bros. Smelting & Refining Co.
Williams Inlay 3; Will-Cast 22	The Williams Gold Refining Co., Inc.

TYPE B, MEDIUM

Alloy	*Manufacturer or distributor*
Aderer-B-Medium	Julius Aderer, Inc.
Aleco No. 1; No. 2	A. L. Engelhardt Co.
Baker Inlay Medium	Baker & Co., Inc.
Chilcast M; 2M	Vernon-Benshoff Co.
Coe 2	Coe Laboratories, Inc.
Crown Inlay No. 1 Hard; Knapp No. 2; T	General Refineries, Inc.
Deetwo	Handy & Harman
GB Inlay No. 2 Medium Hard	Goldsmith Bros. Dental Co.
Jelenko Modulay; Platincast; J-8	J. F. Jelenko & Co., Inc.
Leff Medium Soft	Leff Dental Golds
Luft "B"	John Luft Prescription Alloys
Mowrey's B-Inlay; S-2; No. 91; T	W. E. Mowrey Co.
Ney-Oro A-1; A-10	The J. M. Ney Co.
Noble No. 2	Noble Metals & Alloys Co.
Spyco Inlay; Medium; Tinker One	Spyco Smelting & Refining Co.
S. S. White No. 1; No. 5; No. 820	The S. S. White Dental Mfg. Co.
Stern 1	I. Stern & Co., Inc.

Wildberg "A"	Wildberg Bros. Smelting & Refining Co.
Wilkinson 8M	Wilkinson Co.
Williams Pioneer; Special Inlay; One "Inlay"	The Williams Gold Refining Co., Inc.

TYPE C, HARD

Alloy	*Manufacturer or distributor*
Aderer-C-Hard; "Dressel"	Julius Aderer, Inc.
Baker Hard Inlay	Baker & Co., Inc.
Chilcast No. 2; No. 2-H	Vernon-Benshoff Co.
Coe 3	Coe Laboratories, Inc.
Crown No. 9; Knapp No. 3; Supreme Inlay; TT	General Refineries, Inc.
Deesix	Handy & Harman
GB Inlay No. 3 Hard	Goldsmith Bros. Dental Co.
Jelenko Durocast; Firmilay; J-9	J. F. Jelenko & Co., Inc.
Leff C	Leff Dental Golds
Luft "C"	John Luft Prescription Alloys
Mowrey's S-3; Special; No. 120; TT	W. E. Mowrey Co.
Ney-Oro B; B-2	The J. M. Ney Co.
Noble No. 3	Noble Metals & Alloys Co.
Research No. 5; "Inlay"	Precious Metals Research Works, Inc.
Spyco No. One-H; Six; Tinker Two; Hard	Spyco Smelting & Refining Co.
S. S. White No. 8; No. 13; 860 Hard	The S. S. White Dental Mfg. Co.
Stern 2; 3337; H	I. Stern & Co., Inc.
Wildberg "C"; B	Wildberg Bros. Smelting & Refining Co.
Williams Klondiker; Special "Four"	The Williams Gold Refining Co., Inc.

CERTIFIED DENTAL MERCURIES

(A.D.A. SPECIFICATION NO. 6)

Mercury	*Manufacturer or distributor*
Argentum	Hammond Dental Mfg. Co.
Ballard's	Quicksilver Producers Association
Chemically Pure	The S. S. White Dental Mfg. Co.
Chemically Pure	Stratford-Cookson Co.
C. P. Mercury	Goldsmith Bros. Dental Co.
C. P. Mercury	H. Jelinek Dental Alloys
Crown	General Refineries, Inc.
Dental	Drug Laboratories, Inc.
Dental, C. P.	F. W. Berk & Co., Inc.
Fellowship	Dental Protective Supply Co.
Garfield's	Garfield Smelting & Refining Co.
Garhart's Positively Pure	Garhart Dental Specialty Co.
Krause's Pure	Krause Gold Refineries
Merck Redistilled N.F.	Merck & Co., Inc.
Mercury C. P.	Metalsalts Corp.
Mercury C. P.	Wildberg Bros. Smelting & Refining Co.
Mercury N.F. IX Redistilled	Mallinckrodt Chemical Works
Minimax	The Minimax Co.
Mission	Henry F. Bruce Co.
Mowrey Mercury	W. E. Mowrey Co.
Mynol	Mynol Chemical Co.
Ney	The J. M. Ney Co.
Odontographic	Odontographic Mfg. Co.
Research	Precious Metals Research Works, Inc.

Spectropure	Baker & Co., Inc.
Spyco	Spyco Smelting & Refining Co.
Triple Distilled Mercury	Eastern Smelting & Refining Co.
Twentieth Century	The L. D. Caulk Co.
Williams	The Williams Gold Refining Co., Inc. (Applies to Williams' one pound bottles only, as quarter pound containers are not glass or polyethylene.)

CERTIFIED DENTAL WROUGHT GOLD WIRE ALLOYS

(A.D.A. SPECIFICATION NO. 7)

Alloy	*Manufacturer or distributor*
Aderer No. 20 Clasp	Julius Aderer, Inc.
Baker Q. A.	Baker & Co., Inc.
Crown Hylastic	General Refineries, Inc.
Deepep-Hard	Handy & Harman
GB Medium Fusing; Regular High Fusing	Goldsmith Bros. Dental Co.
Jelenko No. 3 Wire; Super Wire	J. F. Jelenko & Co., Inc.
Ney-Oro Elastic No. 4	The J. M. Ney Co.
Spyco No. 2; No. 4	Spyco Smelting & Refining Co.
S. S. White No. 12; No. 61 Metalba	The S. S. White Dental Mfg. Co.
Stern No. 2657	I. Stern & Co., Inc.
Vernon-Benshoff Clasp Wire No. 6	Vernon-Benshoff Co.
Williams No. 1 Super; No. 2 High Fusing Clasp; No. 3 High Tensile	The Williams Gold Refining Co., Inc.

CERTIFIED DENTAL ZINC PHOSPHATE CEMENTS

(A.D.A. SPECIFICATION NO. 8, FIRST REVISION)

Cement	*Manufacturer or distributor*
Ames Z-M	The W. V-B. Ames Co.
Bosworth's Zinc	Harry J. Bosworth Co.
Caulk Crown and Bridge; Tenacin	The L. D. Caulk Co.
Certicem	Lee Smith Co.
Fleck's Extraordinary	Mizzy, Inc.
Lang Crown Bridge and Inlay	Lang Dental Mfg. Co.
S-C	Stratford-Cookson Co.
Smith's	Lee Smith Co.
S. S. White Silver Improved; Zinc; Zinc Improved	The S. S. White Dental Mfg. Co.

CERTIFIED DENTAL SILICATE CEMENTS

(A.D.A. SPECIFICATION NO. 9, FIRST REVISION)

Cement	*Manufacturer or distributor*
Ames Plastic Porcelain	The W. V-B. Ames Co.
Astralit	Premier Dental Products Co.

Baker Plastic Porcelain	Baker & Co., Inc.
DeTrey's Synthetic Porcelain; Syntrex	The L. D. Caulk Co.
Durodent Enamel	Oskar Schaefer
Smith's Certified Enamel Improved	Lee Smith Co.
S. S. White Filling Porcelain Improved	The S. S. White Dental Mfg. Co.

CERTIFIED HYDROCOLLOIDAL IMPRESSION MATERIALS—AGAR TYPE

(A.D.A. SPECIFICATION NO. 11)

Material	*Manufacturer or distributor*
Coe-Loid 66	Coe Laboratories, Inc.
Crown Hydrocolloid	General Refineries, Inc.
Deelastic	Kerr Mfg. Co.
Dentocoll	The L. D. Caulk Co.
Elastic Colloid	The S. S. White Dental Mfg. Co.
Kerr Hydro-Colloid	Kerr Mfg. Co.
Perfectocoll	Baker & Co., Inc.
Surgident	Surgident, Ltd.

CERTIFIED DENTURE BASE RESINS

(A.D.A. SPECIFICATION NO. 12, SECOND REVISION)

TYPE I, HEAT-CURING

Material	*Form*	*Manufacturer or distributor*
Acralite	Clear; pink; powder-liquid	Acralite Co., Inc.
Acri-Lux	Pink; powder-liquid	Acri-Lux Dental Mfg. Co.
Acrylic A Pink	Pink; powder-liquid	Austenal Laboratories, Inc.
Acrylic A Mottled	Pink; powder-liquid	
Acrylic A Orange-Pink	Pink; powder-liquid	
BioLux "521"	Pink; powder-liquid	B. L. Dental Co., Inc.
Densene 33	Clear; pink; powder-liquid	Cosmos Dental Products, Inc.
Densene 33, Varihued	Pink; powder-liquid	
Denture Acrylic	Clear; pink; powder-liquid	The S. S. White Dental Mfg. Co.
Duraflow	Pink; powder-liquid	Product Research Lab., Inc.
Enciton	Pink; powder-liquid	The L. D. Caulk Co.
Hygienic	Pink; powder-liquid	The Hygienic Dental Mfg. Co.
Improved Justi-Tone T-3	Pink; powder-liquid	H. D. Justi & Son, Inc.
Jectron	Pink; precured blank	Toledo Dental Products Co.
Lang's	Pink; powder-liquid	Lang Dental Mfg. Co.
Lucitone	Clear; pink; powder-liquid	The L. D. Caulk Co.
Luxene 44	Pink; plastic cake	Luxene, Inc.
Miracryl	Pink; powder-liquid	The Motloid Co., Inc.
Palatex	Pink; powder-liquid	Rockland Dental Co., Inc.
Palatex Mottled	Pink; powder-liquid	

Perma Cryl	Pink; powder-liquid	Acri-Lux Dental Mfg. Co.
Tilon	Pink; plastic cake	Ticonium Division, Consolidated Metal Products Corporation
Vernonite	Clear; pink; plastic cake Pink; powder-liquid	Vernon-Benshoff Co.
Vitacrilic	Pink; powder-liquid	Fricke Dental Mfg. Co.
Vita-Lite	Pink; powder-liquid	Vita-Lite Products Co.
Vitalon		
Even Tone	Pink; powder-liquid	Austenal Laboratories, Inc.
Mottle Tone	Pink; powder-liquid	
Tissue Tone	Pink; powder-liquid	

TYPE II, SELF-CURING

Material	*Form*	*Manufacturer or distributor*
Acralite 88, Tissue Tone	Pink; powder-liquid	Acralite Co., Inc.
Acralite 88, True Life	Pink; powder-liquid	
Densene 33	Pink; powder-liquid	Cosmos Dental Products, Inc.
Palatex 51	Pink; powder-liquid	Rockland Dental Co., Inc.

CERTIFIED SELF-CURING REPAIR RESINS

(A.D.A. SPECIFICATION NO. 13)

Material	*Form*	*Manufacturer or distributor*
Bindit	Pink; powder-liquid	Rockland Dental Co., Inc.

Book Reviews

LEHRGANG DER GEBISSREGELUNG (COURSE IN FUNCTIONAL ORTHODONTICS)

By Prof. A. Martin Schwarz. Volume 2: treatment. 2nd edition. 887 pages with 2,600 illustrations. Index. $30. Vienna, Urban & Schwarzenberg, 1956.

This immense second volume is a complete text of orthodontics. It describes every known therapeutic method in use today, its theory and technic. The large part of the material concerns itself with functional jaw orthopedics, or the removable type of appliances as they are used in Europe today. Probably no question regarding these technics remains unanswered by the author. The latest requirements and additions are explained. Every clasp and its construction is shown step by step and described with graphic illustrations. Adams clasps, double plates, vestibule plates, activators and their variations, and the "Kinetor" by Stockfisch, are among those included. Not only improvements in technic, but also theoretical evaluations of various methods are presented. Cephalometric assessments which are little known or used in this country seem to bring out most interesting aspects of diagnosis and treatment planning.

The more than 2,600 illustrations enable even the non-German reader to understand the essence of this orthodontic work. The book itself is bound in a unique manner in the fashion of a loose-leaf family picture album in order that more leaves may be inserted at any time.

Peter J. Picard

THE EVALUATION OF COMMUNITY DENTAL HEALTH—A SYSTEM FOR RECORDING AND STATISTICAL ANALYSIS

By R. M. Grainger, D.D.S., M.Sc.D., D.D.P.H. 2nd revision. 27 pages with tables and graphs. Two appendixes. Bibliography. Toronto, Canada, Dental Statistics and Research Section, Division of Medical Statistics, Ontario Department of Health, March 1957.

The work underlying this brochure was supported in part by a Canadian National Health Grant. The pamphlet contains scholarly text regarding statistical principles and procedures and also reproductions of forms, tables, graphs and other statistical aids to well designed dental health studies and evaluation of programs. It has two purposes: (1) To assist dental health workers in the local health areas of the Province of Ontario in planning and evaluating current activities; and (2) to provide a plan for eventual consolidation and integration of local data into estimates appropriate to larger areas. Illustrative forms for collating local facts into district estimates and for recapitulating the district estimates are presented in an appendix. In a second appendix, tables of percentages are provided to reduce the labor of computing decimal fractions in the collation process when a calculator is not available.

The discussion of the statistical principles and procedures is much more technical than that usually found in chapters on the subject in public health dentistry texts in the United States. It appears, therefore, that in this country the brochure would be primarily useful as a reference manual for statistical consultants to directors of dental health programs or as a reference for dental health workers in consultation with a statistician.

Reading is a little difficult as the type used in the textual portions of the brochure is very small, but it is clear and the lines are widely spaced. The percentage tables are in small type and are closely spaced.

Robert A. Downs

A COMPREHENSIVE CHRONOLOGICAL EVALUATION OF DENTAL HANDPIECE MECHANISMS

By Oscar A. Kohlhaas and Richard M. Kohlhaas. 25 pages with 4 tables. $2.50. Harrisburg, Pa., ROK Publishing Co., 1957.

The first 14 pages contain a superficial and at times inaccurate account of the development of various types of dental handpieces beginning with the hand-drill and ending with the air turbine handpiece. No documentation is given. Some of the terminology is peculiar. Just what would a "Contra angle type straight handpiece" be? Perhaps the authors had in mind a contra-angle handpiece with a long sleeve.

Numerical evaluation of the various types of handpieces is given in the remaining 11 pages. How the relative scores were obtained is not clearly explained. In the preface it is stated: "The comparison figures appearing in the evaluation charts for each of the instruments are based solely on experience ratings, as ob-

tained from over 600 dentists." So apparently the authors, who are in the dental trade, asked 600 or so dentists about such factors as cutting efficiency, application, torque, ease and safety of control, noise, vibration, heat generation, patient acceptance, initial cost, tool costs, maintenance care, and so forth. The authors then attempted to evaluate the users' answers by some scoring method using a range of 100 for the best to 0 for the poorest, except for when the reverse scoring was used, that is, 0 to 100, where noise was evaluated. In the ratings given, the air and water turbine handpieces are the highest.

The booklet with all of its limitations is an interesting document. One has the distinct impression that the authors made an unbiased, though somewhat crude, attempt to rate the various handpieces.

George C. Paffenbarger

DRUGS, THEIR NATURE, ACTION AND USE

By Harry Beckman, M.D. 745 pages with 126 illustrations. Index. $15.00. Philadelphia, W. B. Saunders Co., 1958.

The readers of this book will be aware immediately of its new approach to pharmacology and therapeutics. Even its title is novel.

The emphasis throughout is on those phases of pharmacology and therapeutics which are most important to the clinician in his routine practice. Sources, chemistry, mechanisms of action and treatment of undesired reactions are discussed briefly but adequately. Only the most important and typical drugs in each category are covered thoroughly. Thus the length of the book has been minimized, in the hope that what remains will be more useful to many readers than a more comprehensive book would be. Experience will demonstrate whether or not the result is satisfactory.

The author's characteristic directness and clarity of expression make his writing easily read and understood. The emphasis on the clinical should appeal to students and practitioners alike. Since basic principles are also covered, the book should qualify as a teaching manual.

The editing and the physical characteristics are excellent. The nomenclature conforms to high standards. The lists of references which appear at the end of each chapter are up-to-date. Dentistry is recognized as one of the healing arts by inclusion of a one-page chapter on sodium fluoride and three references to dental applications of drugs in the index. Neither Cobefrin nor Ravocaine are in the index, but there is some information about lidocaine (Xylocaine) in the chapter on local anesthetics.

This book will be most useful to teachers, students and practitioners who find the excellent longer works on pharmacology and therapeutics too formidable for their purposes. It is reliable, reasonably comprehensive and yet compact.

Donald A. Wallace

ORAL HEALTH PROGRAM OF THE DIVISION OF INDIAN HEALTH, ANNUAL REPORT, FISCAL YEAR 1957

By U. S. Department of Health, Education and Welfare. 17 pages with charts and diagrams. Washington, D. C., Public Health Service, Division of Indian Health, Dental Service Branch, 1957.

This Mimeographed booklet apparently covers the subject as expressed in its title rather completely. The text is kept to a minimum and the bulk of the space is devoted to detailed charts and diagrammatic drawings.

The information presented is obviously new, and to those interested either in statistics or in the problems of maintaining dental health for specified groups of people, the booklet must have some value. It does not, however, have mass appeal.

It would be impossible to evaluate the accuracy of the data contained in this short space, but it is assumed that those who prepared it are familiar with their task. The text states: "The purpose of this annual report is three-fold: (1) It emphasizes the disparity between dental services needed and dental services provided; (2) it establishes a basis for comparison for future years, and (3) it provides the factual data required for budget and program justification."

Theodore C. Levitas

MODERN PHARMACOLOGY AND THERAPEUTICS

By Ruth D. Musser, M.S., and Joseph G. Bird, M.D., Ph.D. 843 pages with 16 illustrations. Index. $6.75. New York, The Macmillan Co., 1958.

This is a textbook for students of nursing and medical technology. Dental aspects have been ignored.

The format is almost that of a syllabus. The paragraphs are short and the material is presented largely in tabular form. The small page size should be attractive to students since the book will be easy to hold in the hand or to

carry to class. Review questions and literature references appear at the end of each chapter. There is a ten-page glossary at the back of the book.

The information in the book is up-to-date for the most part and appears to be reliable. The material is palatably and clearly presented. The nomenclature is sound. The distribution of emphasis is probably correct for students of nursing, but would not be suitable for dental students. Mechanisms of action are explained briefly where they are understood. Almost no chemical information is given. In some instances, sources and historical facts are cited.

Modern Pharmacology and Therapeutics is thus a competently written new textbook, undoubtedly adequate for use in the instruction of students of nursing and medical technology.

Donald A. Wallace

THE DESIGN AND CONSTRUCTION OF REMOVABLE ORTHODONTIC APPLIANCES

By C. Philip Adams, B.D.S., F.D.S., D. Orth. Second edition. 114 pages with 173 illustrations. Index. Bristol, England, John Wright & Sons Ltd., 1957.

The object of this book is to try to establish a systematic approach to the construction of removable orthodontic appliances and at the same time to discuss their usefulness and limitations.

The general outline of the second edition remains essentially the same as the first edition.

The book is based on a series of articles, published originally in the *Dental Practitioner*, which dealt with the mechanical principles of orthodontic appliances in general and the design of removable appliances in particular; the soldering of stainless steel for removable appliance construction and the preparation of coil springs. To this material has now been added a fresh chapter discussing the several factors which affect the design and construction of a removable appliance, with frequent reference to specific examples illustrated in other parts of the book; and chapters on the problems of orthodontic technic and on the design and construction of orthodontic clasps.

Many of the well-known types of appliance are no more than mentioned in principle, in the belief that if the principles of their action are understood, the application of these principles can be worked out for use in practice.

The illustrations are very good and the book is recommended to those interested in this type of appliance.

William F. Ford

UNIVERSITY OF ROCHESTER DENTAL RESEARCH FELLOWSHIP PROGRAM

Compiled by the Committee on Publication, Donald G. Anderson, Charles F. Cole, Harold C. Hodge and Erling Johansen. 217 pages with 50 illustrations. Index. Rochester, N. Y., University of Rochester, 1957.

The subtitle of this book is "Proceedings—25th Year Celebration, dedicated to George H. Whipple, Dean and Professor of Pathology, Emeritus." It not only gives an account of the dinner honoring Dr. Whipple but also presents an evaluation of the project from an educational point of view. That this evaluation is favorable is demonstrated by the fact that the University of Rochester is planning to continue the program at approximately double the capacity of the first 25 years.

The participants in the proceedings believe its success to be due to a number of factors including Dean Whipple's competent direction and his almost uncanny ability to select gifted people to work with him on the project.

All candidates had their dental degrees at the time of selection, and since none were permitted to become candidates for an M. D. degree, their training in research and teaching led only to the degree of doctor of philosophy. In a way this reverses the usual practice in dental and medical training by postponing specialized courses in the basic sciences and other subjects to a period following professional work.

In addition to the relating of conventional affairs common to such proceedings, considerable space is given to the philosophy and practice with reference to professional education. There is also a summary of the careers of the graduates and a sampling of the research activities of some of them.

Twenty-one scientific papers by some of the 58 alumni of the program are presented and there are group photographs of most of the participants. Critical study of these proceedings should challenge the attention of dental and medical educators as well as others interested in professional education.

E. H. Hatton

CORRECTION

The publisher listed for the book *A Dentist's Compendium* on page 295 of the February issue of THE JOURNAL was incorrect. The publisher of the book is Henry Kimpton, 134 Great Portland St., London.

Current Literature

IMPORTANCE OF REST AND IMMOBILIZATION IN PERIODONTOSIS AND OTHER SURGICAL PROCEDURES. PRELIMINARY REPORT. (COMUNICACIÓN PRELIMINAR SOBRE LA IMPORTANCIA DEL REPOSO Y CONTENCIÓN EN PARADENTOSIS Y OTRAS PRACTICÁS QUIRÚRGICAS)

I. Vergara Edwards. Rev. A. Odont. Argentina. 44:379 Oct. 1956.

Rest and immobilization of the teeth constitute the basic treatment of periodontosis at any stage of the disease. They are indispensable if satisfactory results from dental surgery are to be secured. A device for immobilization should be esthetic and firm; the firmer the immobilization, the better the results. Satisfactory results have been obtained with rest and immobilization in instances of radicular fractures. The good results are still present five to eleven years after discontinuance of treatment.

In 1950, experiments with an immobilizing material were started and a technic for treatment was developed. The device is esthetic, firm and does not interfere with the comfort of the patient.

Preparation of the patient includes clinical, roentgenographic and laboratory examinations and cleaning of the buccodental structures. The operation is carried out as follows:

Under anesthesia, an ample flap of the "Newman" or "L" type is prepared on the perimeter of all the teeth which are being treated. The free edge of the flap is turned and the calculus and granulation tissue are removed. The internal surface of the flap and the lingual mucosa (as the case might be) are carefully but conservatively scraped until the roots are smooth and free of necrotic cement. Powder sulfapenicillin or chloromycetin is placed on the surgical field or 300,000 to 500,000 units of penicillin are injected. The flap is then replaced and sutured.

The steps for preparing the device for immobilization are the following:

1. The crowns of the teeth to be treated are covered with tin foil for the purpose of obtaining a tin foil impression.
2. An alginate impression is taken over the tin foil covering with an adequate tray.
3. The alginate impression is removed and to it is attached the tin foil impression.
4. The tin foil impression is slightly coated with petroleum jelly. The immobilizing material is made into a paste by adding to it an adhesive liquid.
5. It is then quickly placed into the alginate impression and again in the mouth. The immobilizing material is kept in proper position in the mouth by keeping the tray firmly in position with the alginate and tin foil impressions for ten minutes. After this time, the tray with the alginate impression is removed first, and then the tin foil is removed. Remnants of tin foil, if any, are removed with burs. If the device for immobilization is slightly insufficient at any time, immobilizing material is prepared as already described and added when it is needed. The device remains fixed to the teeth until immobilization is discontinued after one or two months.

When patients wear dental bridges, the natural and artificial teeth are covered with tin foil, then the dental bridge is removed and immobilization is carried out as described. The immobilizing material substitutes for artificial teeth during the entire time that it is left in place. The results are a magnificent esthetic effect. When, after one or two months, immobilization is discontinued, the device and the stitches of the flap are removed. The gingiva is healthy and there are no cul-de-sacs. The mobility of the teeth has disappeared or it is mild depending on the degree of reinsertion of roots and of bone regeneration obtained from the treatment and also on the degree of atrophy that was present before the treatment.

The technic can be simplified by using the immobilizing material alginate without making a tin foil impression or by using a sheet of acrylic resin material as if it were a tray for carrying the material into the mouth to be retained until it hardens for immobilization.

FROM THE PRACTICE FOR THE PRACTICE (AUS DER PRAXIS FÜR DIE PRAXIS)

J. Vollmar and H. Talkenberger. Deut. zahnärztl. Zschr. 11:44 Jan. 1956.

The consideration of esthetics and the correct manipulation of dental ceramics should play important parts in the construction of crowns, bridges, partial and complete dentures. The prosthetic restoration always should be satisfying to both the dentist and the patient.

As the result of each prosthetic procedure, the patient expects, and has a right to expect, an unchanged or an improved facial

expression. To achieve a satisfying result, the following procedures are recommended: (1) the impressions are taken in the customary manner; (2) the models are cast, and on them all teeth which cannot be preserved or which have caused functional or esthetic disturbances are eliminated; (3) the artificial teeth and crowns are placed in position or attached to bridges, partial or complete dentures on the models to show that a maximum of functional and esthetic effects has been achieved, and (4) the replica then can be observed by the patient and his suggestions invited.

The practical value of such procedures, and the success obtainable in the most difficult instances, are demonstrated by the following three typical examples:

1. The patient's upper anterior teeth were injured and became loose as a result of an automobile accident. The incisors could not be preserved. The gap between the central and lateral incisors, present prior to the accident, had influenced the facial expression of the patient unfavorably. After the incisors were extracted, they also were eliminated on the model. The artificial teeth then were placed in a slightly changed position as suggested by the patient. The insertion of a bridge completed the prosthetic procedure.

2. A strong protraction existed in the maxilla and a diastema in the region of the anterior teeth. When the patient's mouth was slightly open, his lower lip lay behind the upper incisors. The constant pressure exerted by the lips had caused an increase in tilting and later a loosening of all upper anterior teeth. Immediate restoration was indicated not only because of the distortion of the facial expression but because of the danger that this condition could lead to the loss of all upper teeth. The elimination of the four upper incisors on the model and their replacement by artificial teeth of a shape and size slightly different from the natural teeth and in an altered position, with desirable functional and esthetic effect, could be demonstrated to the patient. Treatment consisted of extraction of all upper incisors and insertion of a bridge attached to three-quarter crowns.

3. In this patient, the loss of the right lateral incisors in both jaws had caused a displacement of the right central incisors. The tilting and turning of both central incisors had resulted in gaps between the upper as well as the lower central incisors. The prosthetic solution, which was demonstrated to the patient on the models, was the elimination of the central incisors, replacement by artificial teeth, correctly positioned, and modeling the right lateral incisors to a desired form and size. After selection of teeth, superior in color, form and size to the natural teeth, the disturbing spaces were closed in a manner free of functional and esthetic disturbances. The treatment consisted of extraction of the teeth which could not be preserved, and restoration by a bridge supported by collar crowns.

This method can be utilized in all instances in which esthetic considerations require an improvement of the facial appearance. This goal will be obtained through changing the form and size of the teeth in the restoration and selecting a color similar or superior to that of the natural teeth.

THE EFFECT OF FLUORIDE ON THE SOLUBILITY OF TRICALCIUM PHOSPHATE IN WEAK ACIDS

R. W. Moncrieff. Brit. D. J. 102:488 June 18, 1957.

Tricalcium phosphate, in the presence of weak solutions of gluconic or citric acid, dissolves slowly, and if sodium alginate is present, the calcium ions form a gel of calcium alginate. When 1 ppm of fluoride is added to the mixture, solution does not occur and no gel is formed. Even the presence of 0.2 ppm of fluoride has an effect on the formation of calcium ions.

The results support the view that the protective action of fluorides on teeth is due to reduction of the solubility of inorganic matter in slightly acid solutions.

Henry M. Leicester

PERIPHERAL ODONTOGENIC FIBROMA WITH CEMENTOGENESIS: REPORT OF CASE

Norman Buckman. J. Oral Surg. 16:163 March 1958.

Gingival fibromas are common oral lesions and constitute two per cent of all growths found in the oral cavity. As they may arise from periosteum or periodontal membrane, calcifications are often noted in the fibrous connective tissue stroma.

This report illustrates the presence of prominent trabeculae of cementum in a massive gingival fibroma of about 15 years' duration. It occurred in a 55 year old Navajo Indian woman. The tumor arose from the labiogingival region of the mandibular incisor region, extending from the right mandibular cuspid to the region of the left lateral incisor, and enveloping and displacing these teeth. Although the patient used the incisal table of the lesion as a masticatory platform, its sur-

face was not ulcerated or hemorrhagic. The histopathological diagnosis of the resected mass was peripheral odontogenic fibroma with cementogenesis.

Descriptions of gingival tumors have often been confused by the inconsistency of terminology. A workable, histopathological classification of such lesions is presented, emphasizing how this tumor logically fits into this classification.

The origin and nature of calcifications in gingival fibromas are analyzed. Although on a histological basis it might be expected that cementum would be found in many of these lesions, only a few such instances have been documented. It is reasonable to assume that there exists a higher incidence of cementum in peripheral odontogenic fibromas than has been reported. Undoubtedly, cementum has often been confused with bone in such tumors.

The size, presence of cementum and long-standing nature of this peripheral, odontogenic fibroma make it of interest.

METHODS FOR FIXATION OF PARTIAL DENTURES (BEFESTIGUNGSMÖGLICHKEITEN PARTIELLER PROTHESEN)

Frederico Singer. Deut. Zahnärzte Kal. 15:34 1956.

The most controversial and seemingly contradictory phase of partial denture design and construction is that of the clasp components. Two basic functions are performed by denture clasps: (1) the retention of the prosthesis and (2) the cushioning of lateral forces from the denture to the abutment teeth.

Denture clasps, properly designed, have the following advantages: (1) they are not difficult to construct and are easy to attach; (2) they may be repaired without difficulty, and (3) no preparation of the remaining teeth other than slight grinding of the abutment teeth is necessary. The clasps must embrace the supporting teeth firmly; therefore, the use of one-armed and two-armed clasps often is contraindicated; three armed clasps are preferred.

An alternative method of effecting primary retention is by the application of spring tension against undercut surfaces with parallel sides. Two important European types of construction used in free-end saddle dentures are the Tübingen double spring, constructed by Strack, and the Van Thiel cap bar in which the masticatory surfaces of all abutment teeth are covered by cast caps which permit a lateral force transmission and increases rigidity.

These spring attachments have the following advantages: (1) they are not visible from the outside, therefore they produce the desired esthetic effect; (2) their firm position gives the patient a feeling of security; (3) the baseplate can be more strongly constructed, which allows easier speech and better mastication; (4) the danger of caries, which is considerable under customary clasps, is decreased because the abutment teeth are capped, and (5) the periodontium is free from strain because the stress on the abutment teeth is in a vertical direction only.

These spring attachments can be classified as typical, such as those constructed by Chayes, Ash, Golobin, Brown-Sörensen, Stern-McCollum, and others, and atypical, consisting of precision double anchorages as introduced by Biaggi, Vest, and others.

Appliances with stress-breaker attachments require: (1) perfectly adapted clasps; (2) normally formed bases perfectly adapted to the ridge surface, and (3) a minimum of tooth involvement.

The advantages of stress-breaker attachments are: (1) increase of resiliency of the periodontal membrane; (2) a constant balance between the stress-bearing of the abutment teeth and that of the alveolar ridges; (3) prevention of bone resorption about all abutment teeth because of the elimination of tipping strain; (4) physiologic stimulation of the mucosa; (5) reduction of all strains and prevention of trauma to the abutment teeth, and (6) improvement of oral comfort by the relative passivity of the partial denture.

Precision attachments are ideal for partial dentures, especially for free-end saddle prostheses.

DISTRIBUTION OF OXYGEN AND NITROUS OXIDE FROM A CENTRAL SOURCE IN ORAL SURGERY OFFICES

William E. Doering. J. Oral Surg. 15:194 July 1957.

Although now a standard detail in hospital design, the use of centralized sources of gas distribution is relatively new in dental suite use. A study of three dental suites in the Pittsburgh area discloses that this form of gas handling is rapidly becoming an important factor in the dental office procedure.

The value of centralized gas distribution is based primarily on the removal of the cylinders from the operating room area. This results in the following advantages: (1) valuable space is saved in operating room areas; (2) confusion from working around several gas cylinders is

eliminated; (3) fire hazard is reduced since gases enter operating room at low pressure; gas may be turned off at shut-off valves controlled from a location near (but not in) operating areas; (4) possibility of personnel or property damage from mishandled cylinders is considerably lessened; (5) gas is provided instantaneously; (6) no possibility exists of delay in the changing of cylinders and regulators during surgery; switch resets automatically when cylinders are changed in service bank; and reserve bank gives insurance against supply exhaustion at inopportune times; (7) distinct psychological advantages exist because patients see "built-in" facilities but no cylinders in operating room.

SPEECH FUNCTION IN RELATION TO LOSS OF TEETH AND ARTIFICIAL DENTURES (SPRACHFUNKTION BEI ZAHNVERLUST UND ZAHNERSATZ)

Erwin Reichenbach. Quintessenz 7:25 Feb. 1956.

Loss of teeth has little influence on the speech function in formation of the vowels A, E, I, O, U and their mutations.

In producing the S sound, the tongue forms a channel through which the air stream escapes above the central lower incisors. When a central upper incisor is missing, a sharp and unpleasant S is formed. The loss of a single lateral upper incisor usually does not disturb the correct formation of the S sound. The loss of teeth, particularly of upper anterior teeth, permits too much air to escape. Even if the tongue tries to compensate, both the S and the Z usually are distorted. In an edentulous mouth, the S, Z and Sh (in German Sch) sounds are vague and "blown away."

The F and V (in German W) sounds are created by a combined effort of the lower lip and the upper teeth. When central or lateral incisors are missing, these sounds become dull. When all incisors are missing, both sounds are hardly audible. The lips, in an instinctive compensation, form a small opening which resembles the action of blowing out a candle. Loss of upper and lower incisors cause a formation of labioalveolar F and V sounds. These labioalveolar sounds are common in many African languages.

When teeth are missing, the B and P sounds can be normal, but the sunken lips cause a facial distortion.

In the formation of the S sound, the tongue touches the anterior part of the palate, divides the air stream, and the air escapes on both sides between cheeks and buccal surfaces of the posterior teeth. Gaps in the dental row usually change the direction of the air escape and disturb the L sound.

After an insertion of artificial dentures, the anatomic dental defect should be eliminated, and the speech function should not be influenced. Faults in the denture construction, however, are factors in improper speech function. A denture may be perfect from the standpoint of esthetics, comfort, occlusion and mastication, and still possess slight flaws which can disturb proper speech function.

Many persons lisp or stammer when they wear upper dentures for the first time because of the unaccustomed material which covers the palate. People with normal hearing, however, learn quickly to compensate for the artificial appliance and soon are able to produce normal sounds. The formation of the S often is disturbed when the base of the denture is too thick. In such instances, the patient is not able to compensate for the artificial denture with tongue movements and placements. The patient usually regains normal speech function after the defect is corrected or a new denture is constructed.

If the artificial rugae palatinae in plastic dentures are missing or incorrectly constructed, the tongue loses its orientation, and phonetic disturbances occur.

Stippling the labial surface of upper dentures, even though the procedure results in a more natural appearance, may cause interferences with the upper lip and distort normal articulation. Sometimes a minor correction in the design and construction of artificial dentures can correct speech defects.

POSITIONAL CHANGES OF THE SOFT PALATE DURING FORMATION OF DIFFERENT SOUNDS (VERSUCHE ZUR DARSTELLUNG DES WEICHEN GAUMENS WÄHREND DER LAUTBILDUNG)

Egon Banger. Deut. Zahnärztebl. 10:328 May 8, 1956.

The prosthetic department of the Dental Institute of the University of Münster, Germany, studied the functional movements of the soft palate during the formation of different sounds.

Patients with defects of cheeks or palate were observed roentgenographically during the study. The roentgenograms then were compared with those of healthy persons.

The position of the soft palate during the formation of guttural sounds in cleft palate patients differed significantly from that observed in healthy persons. The diminution of

the air stream necessary in forming guttural sounds was accomplished involuntarily by a movement of the soft palate toward the defective region and by a compensatory movement of the tongue toward the anterior region.

The existence of such compensatory movements in cleft palate patients during the formation of sounds has been neglected in medical and dental literature.

Occasionally, dentists make restorations for patients with either cleft or perforated palates. In such instances, the retention of an obturator may have a direct influence on the denture which is to be inserted. If the perforation in the palate is comparatively remote from the region of the partial denture, the defect may be closed surgically or with a self-retaining mechanical obturator before or after the insertion of the denture. If, however, the defect is situated in the immediate region of the denture, such as an opening into the maxillary sinus, it should be corrected prior to denture insertion.

Based on the results of the roentgenographic examinations and comparisons, it is possible to construct obturators which permit cleft palate patients not only to achieve a natural formation of sounds but also allow the controlling of them during function.

THE MELKERSSON-ROSENTHAL SYNDROME (DAS MELKERSSON-ROSENTHAL SYNDROM)

Dieter Schlegel. Deut. Stomat. 6:474 Aug. 1956.

Several articles have appeared in German and Scandinavian literature on the pathogenesis of the Melkersson-Rosenthal syndrome, a symptom complex which is seldom mentioned in the literature of other countries.

In 1928, the Swedish physician, E. Melkersson, reported that he observed a set of similar symptoms in several patients. Three years later, the German neurologist, Curt Rosenthal, discovered the same syndrome in four patients and members of their families. This syndrome, later called the Melkersson-Rosenthal syndrome, is characterized by the combination of three symptoms: (1) a slight facial paralysis; (2) a fissured or geographic tongue, and (3) an abnormal enlargement of both lips.

Histologically identical symptoms were described by the German dermatologist, Miescher, in instances of lymphangioma and cretinism.

The fissured tongue with its typical deep depressions or furrows and the geographic tongue are symptoms which can be diagnosed easily. The origin and development of the pathologic process of both the fissured and the geographic tongue were explained by Doering as disturbances of the parasympathetic innervation of the tongue in which the lingual, the chorda tympani and the facial nerves were involved. Angioneurotic edemas appear in the vegetative nervous system, especially in the small, deep petrosal nerve.

The etiology of the Melkersson-Rosenthal syndrome is unclear. Eosinophilia of an allergic origin seems to be one of the causative factors. Tappensteiner, however, found that in an isolated instance cure was effected after elimination of a denture made of acrylic resin.

Differential diagnosis should be concerned with the papulonecrotic tuberculid and with the sarcoid of Boeck. It is most probable, however, that this syndrome is caused by a chronic hematogenic disturbance in the blood circulation. This is indicated by the disease's course, the mild lymphocytosis, the increased sedimentation rate of the blood, and the increase in alpha and gamma isomers which are observable in electrograms. Also the increase in epithelial and Langerhans' giant cells confirms this indication.

The differential diagnosis also must consider incompletely developed forms of chronic facial erysipelas, tuberculosis, syphilis and actinomycosis. Macrocheilia also may be present as in lymphangioma. Secondary edema of the lips may follow furuncles and abscesses in the oral cavity.

For diagnosis and treatment of the Melkersson-Rosenthal syndrome it must be realized that it may arise "overnight." Treatment consists mainly of the immediate elimination of all substances capable of inducing allergy or specific susceptibility such as infected teeth and artificial dentures.

In extreme instances, a wedge-shaped incision on the enlarged lips will have a curative result. It also will improve the patient's appearance. Some believe that cortisone medication achieves profound systemic and metabolic effect; others recommend the application of blood-sucking leeches.

Deaths

Allen, Homer G., St. Petersburg, Fla.; Royal College of Dental Surgeons, School of Dentistry, Toronto, Ontario, Canada, 1924; died November 26; age 56.

Anderson, Thomas B., Oakland, Calif.; died December 18.

Banghart, Leo F., Orlando, Fla.; Detroit College of Medicine Department of Dental Surgery, 1900; died November 28; age 77.

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Bauman, John A., Mount Vernon, N. Y.; Philadelphia Dental College, 1901; died December 6; age 81.

Bovard, James E., Kane, Pa.; University of Pittsburgh School of Dentistry, 1921; died December 29; age 61.

Bracewell, Joseph L., Dothan, Ala.; Atlanta Dental College, 1910; died December 20; age 73.

Bradley, Michael C., Rochester, N. Y.; University of Buffalo School of Dentistry, 1899; died December 8; age 90.

Brouillet, Charles S., Athol, Mass.; Temple University School of Dentistry, 1909; died December 14; age 73.

Brownell, Harry L., Monterey, Calif.; College of Physicians and Surgeons, San Francisco, 1916; died December 25; age 63.

Burnham, Hugh J., Austell, Ga.; Emory University School of Dentistry, 1949; died December 2; age 35.

Buscaglia, Joseph T., Milwaukee, Wis.; Marquette University Dental School, 1946; died December 12; age 42.

Cawthon, Noel Marshall, Arlington, Fla.; Atlanta-Southern Dental College, 1941; died December 10; age 47.

Chiles, James A., Richmond, Va.; Tufts College Dental School, 1923; died December 24; age 59.

Christensen, Samuel D., Bakersfield, Calif.; University of Southern California School of Dentistry, 1932; died December 14; age 50.

Clark, Robert L., Kirksville, Mo.; Kansas City-Western Dental College, 1935; died October 31; age 56.

Clayton, William C., Birmingham, Ala.; Southern Dental College, Atlanta, Ga., 1915; died November 28; age 69.

Cohen, Max A., Philadelphia, Pa.; Temple University School of Dentistry, 1936; died September 27; age 45.

Collins, George Allen, Newark, N. J.; University of Pennsylvania School of Dentistry, 1916; died December 28; age 65.

Colliton, William F., Washington, D. C.; Georgetown University School of Dentistry, 1923; died December 4; age 64.

Comfort, Albert H., Collingswood, N. J.; Royal Dental Institute of Constantinople, Turkey, 1902; died January 6; age 75.

Connolly, George I., South Boston, Mass.; Georgetown University School of Dentistry, 1915; died December 5; age 67.

Constable, Roy V., Floral Park, N. Y.; Northwestern University Dental School, 1902; died January 5; age 83.

Cooke, John M., Marinette, Wis.; Northwestern University Dental School, 1917; died November 23; age 65.

Cornell, Seborn M., Linton, Ind.; Indiana University School of Dentistry, 1926; died December 24; age 54.

Croal, Vincent C., Santa Ana, Calif.; College of Physicians and Surgeons, San Francisco, 1924; died December 11; age 58.

Danilin, Morris, Corona, N. Y.; New York College of Dentistry, 1922; died November 11; age 58.

DaPrato, Robert H., Sacramento, Calif.; College of Physicians and Surgeons, San Francisco, 1955; died December 25; age 29.

DeHaas, Ernest P., New Salem, Pa.; University of Pittsburgh School of Dentistry, 1918; died December 25; age 62.

Dittes, Robert M., Napa County, Calif.; University of Minnesota School of Dentistry, 1927; died November 23; age 60.

Drummond, John F., Gary, Ind.; Northwestern University Dental School, 1914; died October 13; age 65.

Dudley, Sydney D., Petersburg, Va.; Atlanta Dental College, 1910; died December 5; age 70.

Dunnigan, Ernest P., Kaleva, Mich.; University of Michigan School of Dentistry, 1934; died December 10; age 47.

Eigenrauch, Justus H., Jersey City, N. J.; Pennsylvania College of Dental Surgery, Philadelphia, 1905; died December 10; age 75.

Ellman, Isidor W., Brooklyn, N. Y.; New York College of Dentistry, 1915; died December 20; age 64.

Elsky, Leonard P., Worcester, Mass.; Tufts College Dental School, 1943; died November 23; age 36.

Emerson, Arthur C., Maple Plain, Minn.; Northwestern University Dental School, 1924; died November 11; age 63.

Felton, Henry B., Milwaukee, Wis.; University of Michigan School of Dentistry, 1917; died December 30; age 61.

Fenton, Maurice E., Cleveland; Western Reserve University School of Dentistry, 1894; died November 21; age 89.

Finucan, Edwin T., Eau Claire, Wis.; Marquette University Dental School, 1914; died December 14; age 68.

Fletcher, Cecil G., Hillsdale, N. Y.; Harvard Dental School, 1914; died January 6; age 65.

Friedland, Solomon L., Brooklyn, N. Y.; New York College of Dentistry, 1905; died November 28; age 75.

Gethro, Fred W., Chicago; Northwestern University Dental School, 1899; died December 29; age 84.

Gillis, Joseph H., Toledo, Ohio; Indiana University School of Dentistry, 1925; died December 6; age 58.

Gladstone, Jules, Los Angeles; University of Pennsylvania School of Dentistry, 1923; died January 3; age 58.

Gold, Hosea S., Ellwood City, Pa.; University of Pittsburgh School of Dentistry, 1923; died December 20; age 62.

Gorham, Anthony F., Camden, N. J.; University of Pennsylvania School of Dentistry, 1923; died December 13; age 61.

Green, George P., Richmond, Va.; University of Maryland Dental Department, Baltimore, 1921; died September 30.

Gremillion, Cyraque J., Alexandria, La.; Loyola University School of Dentistry, New Orleans, 1937; died November 18; age 48.

Griffin, Samuel L., Jr., Glasgow, Mo.; St. Louis University School of Dentistry, 1943; died November 18; age 38.

Grumet, Jacob, Nashville, Tenn.; University of Tennessee College of Dentistry, 1920; died December 30; age 65.

Haidle, Allison W., Naples, Fla.; University of Michigan School of Dentistry, 1925; died December 7; age 55.

Hain, Dudley A., Avon Lake, Ohio; Western Reserve University School of Dentistry, 1933; died November 30; age 54.

Halpern, Oscar, Cleveland; Western Reserve University School of Dentistry, 1915; died December 2; age 67.

Hamilton, Albert G., Wellsboro, Pa.; Philadelphia Dental College, 1900; died November 20; age 77.

Hanning, William F., Indianapolis; Indiana University School of Dentistry, 1940; died December 28; age 43.

Hazlett, Oscar O., Waterford, Pa.; University of Pittsburgh School of Dentistry, 1914; died December 16; age 70.

Hedick, Anderson M., Palatka, Fla.; Atlanta Dental College, 1908; died November 21; age 70.

Heverly, Samuel F., Cedar Falls, Iowa; University of Iowa College of Dentistry, 1896; died December 7; age 88.

Hitchner, Elam M., Moorestown, N. J.; University of Pennsylvania School of Dentistry, 1918; died December 14; age 61.

Holland, Keron J., Joliet, Ill.; Chicago College of Dental Surgery, 1907; died December 29; age 81.

Holmes, Frank R., Eastport, Maine; Philadelphia Dental College, 1905; died November; age 78.

Howell, Leroy A., Tallahassee, Fla.; Meharry Medical College School of Dentistry, 1910; died November 24; age 73.

Hughes, James S., Whitestone, L. I., N. Y.; Columbia University School of Dental and Oral Surgery, 1926; died December 23; age 54.

Innis, Lawrence L., Innis, La.; Northwestern University Dental School, 1909; died November 16, age 69.

Jacobs, Leon H., Exeter, N. H.; Tufts College Dental School, 1915; died December 9; age 64.

Johnson, Ivar C., Fort Bliss, Texas; University of Michigan School of Dentistry, 1931; died December 11; age 52.

Jordan, Vernon J., Punta Gorda, Fla.; Southern Dental College, Atlanta, Ga., 1914; died November 10; age 71.

Jordan, William H., Branson, Mo.; Northwestern University Dental School, 1901; died December 8; age 78.

Keller, David H., East Orange, N. J.; Northwestern University Dental School, 1902; died January 5; age 77.

Kelly, Ernest B., Chicago; Chicago College of Dental Surgery, 1902; died January 15; age 79.

Kennedy, George L., Villa Grove, Ill.; Chicago College of Dental Surgery, 1904; died November 30; age 78.

Klein, David G., Boston; Harvard Dental School, 1913; died January 1; age 65.

Knutson, Frank E., Minneapolis; University of Minnesota School of Dentistry, 1949; died December 8; age 32.

Laburre, Lucien A., New Orleans; Loyola University School of Dentistry, New Orleans, 1922; died December 28; age 58.

Latham, Vida A., Chicago; University of Michigan School of Dentistry, 1892; died January 17; age 91.

Leahey, Francis J., Lilly, Pa.; University of Pittsburgh School of Dentistry, 1925; died November 27; age 59.

Lewis, James W., Elcho, Wis.; Marquette University Dental School, 1916; died December 4; age 63.

Lichtman, Samuel, Tonawanda, N. Y.; University of Buffalo School of Dentistry, 1933; died December 8; age 48.

Light, John F., Waltham, Mass.; Philadelphia Dental College, 1904; died December 3; age 84.

Lilly, Oswell W., Princeton, W. Va.; Louisville College of Dentistry, 1917; died December 23; age 64.

Lofgren, Carl R., Portland; North Pacific College of Oregon School of Dentistry, Portland, 1918; died December 1; age 61.

Longo, Walter S., East Port Chester, Conn.; University of Maryland Dental Department, Baltimore, 1922; died December 20; age 62.

Lyke, J. Hyatt, New York; Philadelphia Dental College, 1884; died December 17; age 93.

MacDonald, James R., St. Petersburg, Fla.; Philadelphia Dental College, 1901; died November 22; age 79.

Maloney, James H., Quincy, Mass.; Philadelphia Dental College, 1903; died January 14; age 77.

Manhard, Ormond H., St. Louis; Washington University School of Dentistry, St. Louis, 1892; died November 29; age 89.

Marshall, John R., Portland; North Pacific College of Oregon School of Dentistry, Portland, 1908; died December 31; age 77.

Matthews, James A., Jacksonville Beach, Fla.; University of Pennsylvania School of Dentistry, 1923; died December 5; age 58.

Matthews, William H., Philadelphia; Philadelphia Dental College, 1904; died December 27; age 82.

McLay, Frank P., North Andover, Mass.; Baltimore College of Dental Surgery, University of Maryland, 1917; died November 26; age 59.

McMeekin, Joseph D., Winnsboro, S. C.; Louisville College of Dentistry, 1905; died November 1; age 78.

McPherson, John L., Troutdale Ore.; North Pacific College of Oregon School of Dentistry, Portland, 1919; died December 1; age 67.

Merrifield, Frederick W., Wilmette, Ill.; Northwestern University Dental School, 1916; died January 6; age 70.

Minster, William L., Philadelphia; University of Pennsylvania School of Dentistry, 1900; died December 14; age 78.

Monzingo, Herschel L., Tacoma, Wash.; North Pacific College of Oregon School of Dentistry, Portland, 1924; died November 22; age 58.

Mooreland, William F., Carbondale, Ill.; Meharry Medical College School of Dentistry, 1919; died December 4; age 61.

Morse, Frank C., Long Beach, Calif.; North Pacific College of Oregon School of Dentistry, Portland, 1917; died December 4; age 64.

Mullin, Joseph H., Lawton, Okla.; Northwestern University Dental School, 1903; died December 3; age 77.

Murray, Joseph L. B., Washington, D. C.; Georgetown University School of Dentistry, 1917; died November 14; age 61.

Myers, Harry A., Elma, Wash.; Kansas City-Western Dental College, 1928; died December 12.

Neenan, Edward W., Oak Park, Ill.; St. Louis University School of Dentistry, 1925; died December 28; age 54.

Nick, Carl T., Orlando, Fla.; Western Reserve University School of Dentistry, 1909; died November 23; age 71.

Nowlin, Clarence D., Columbia, Tenn.; Vanderbilt University School of Dentistry, 1900; died December 26; age 79.

Noyes, Raymond G., Troy, N. Y.; University of Pennsylvania School of Dentistry, 1931; died December 29; age 60.

Oakley, Myron H., Rogers, Ark.; Kansas City-Western Dental College, 1924; died January 12; age 61.

O'Connell, Thomas L., Providence, R. I.; University of Maryland Dental Department, Baltimore, 1914; died November 25; age 72.

O'Neal, Emmett L., Winsboro, La.; Southern Dental College, Atlanta, Ga., 1914; died November 21; age 65.

Osborne, E. E., Clendenin, W. Va.; Cincinnati College of Dental Surgery, 1924; died December 3; age 59.

Parrish, Roscoe S., Bloomington, Ind.; Indiana University School of Dentistry, 1927; died November 12; age 55.

Prinz, Hermann, Lansdowne, Pa.; University of Michigan School of Dentistry, 1896; died November 24; age 89.

Pursell, Francis M., Akron, Ohio; Ohio College of Dental Surgery, University of Cincinnati, 1907; died November 28; age 73.

Purtell, John E., Milwaukee; Marquette University Dental School, 1899; died December 26; age 82.

Raedel, Evald H., Chicago; Chicago College of Dental Surgery, 1906; died December 28; age 78.

Rhen, Louis J., Atlantic City, N. J.; Temple University School of Dentistry, 1928; died December 12; age 51.

Rhodes, Arthur B., Columbus, Ohio; Ohio State University College of Dentistry, 1924; died December 17; age 64.

Ricketts, William H., Snow Hill, Md.; Baltimore College of Dental Surgery, University of Maryland, 1917; died December 2; age 74.

Rile, Charles M., Rock Island, Ill.; Chicago College of Dental Surgery, 1917; died December 5; age 61.

Robinson, Alan Mcd., San Francisco; College of Physicians and Surgeons, San Francisco, 1919; died December 21; age 65.

Robinson, Henry L., Sulphur, La.; Tulane University School of Dentistry, 1918; died November 27; age 66.

Rucks, Lee P., Birmingham, Ala.; Atlanta-Southern Dental College, 1929; died December 24; age 53.

Ryan, Frank J., Holland, Mich.; University of Illinois College of Dentistry, 1903; died December 13; age 89.

Sanderson, Thomas K., Woodburn, Ore.; North Pacific College of Oregon School of Dentistry, Portland, 1907; died December 12; age 75.

Saunders, Bert E., Elyria, Ohio; Western Reserve University School of Dentistry, 1897; died December 27; age 82.

Schuman, Elihu L., Simsbury, Conn.; Columbia University School of Dental and Oral Surgery, 1931; died September 25; age 51.

Seal, Justin F., Indianapolis; Indiana University School of Dentistry, 1929; died December 6; age 50.

Southwick, Charles B., Mount Pleasant, Mich.; University of Michigan School of Dentistry, 1895; died December 11; age 87.

Spindle, Jack S., Ector, Texas; Baylor University College of Dentistry, 1934; died December 18; age 55.

Stanton, Wellan O., East Lansing, Mich.; University of Michigan School of Dentistry, 1940; died December 21; age 41.

Stark, S. S., Phoenix, Ariz.; Chicago College of Dental Surgery, 1913; died December 25; age 74.

Stevens, Murrell A., Rutland, Vt.; Ohio College of Dental Surgery, University of Cincinnati, 1907; died November 18; age 79.

Stewart, Conrad F., Algonac, Mich.; Detroit College of Medicine Department of Dental Surgery, 1901; died October 17; age 89.

Stiernberg, Robert C., Huntsville, Texas; University of Illinois College of Dentistry, 1919; died December 7; age 66.

Street, James D., Brooklyn; College of Dental and Oral Surgery, New York, 1908; died December 29; age 76.

Strenge, Arthur L., Pittsfield, Mass.; Baltimore College of Dental Surgery, University of Maryland, 1913; died January 7; age 67.

Sullivan, Robert F., Savannah, Ga.; Atlanta Dental College, 1916; died October 19; age 69.

Swartz, Edwin B., Pittsburgh; Pittsburgh Dental College Western University of Pennsylvania, 1901; died October 13; age 79.

Teaff, James W., Cleveland; Northwestern University Dental School, 1923; died November 20; age 57.

Tessler, Maurice H., St. Louis; St. Louis University School of Dentistry, 1924; died December 3; age 55.

Tidball, George V., Pittsburgh; University of Pittsburgh School of Dentistry, 1929; died October 24; age 52.

Tomkins, Samuel S., Atlantic City, N. J.; Medico-Chirurgical College of Philadelphia, 1912; died January 3; age 73.

Tuttle, Roland D., Winston-Salem, N. C.; Atlanta Dental College, 1917; died December 17; age 65.

Underwood, Charles M., Rockville Centre, N. Y.; Harvard Dental School, 1936; died November 23; age 46.

Warner, George R., Denver; Colorado College of Dentistry, 1898; died December 25; age 85.

Wells, John F., Kasson, Minn.; University of Minnesota School of Dentistry, 1923; died November 15; age 59.

Wells, Robert F., Decatur, Ga.; Atlanta-Southern Dental College, 1914; died January 26; age 66.

West, Raleigh C., Petrolia, Calif.; died August 1; age 81.

Wilkins, William J., East Jeffrey, N. H.; Baltimore Medical College Dental Department, 1909; died October 21; age 74.

Wilkinson, Herbert M., Chicago; Loyola University School of Dentistry, Chicago College of Dental Surgery, 1929; died January 31; age 54.

Winget, William H., Peoria, Ill.; Marion-Sims Dental College, St. Louis, 1901; died November 4; age 79.

Wolf, Sheldon H., Washington, Pa.; Baltimore College of Dental Surgery, University of Maryland, 1895; died January 21; age 87.

Wolford, William H., Mansfield, Ohio; Starling-Ohio Medical College Department of Dentistry, 1912; died January 24; age 70.

Wood, Warren A., Philadelphia; Medico-Chirurgical College of Philadelphia, 1915; died January 15; age 65.

Worley, Jesse W., Salem, W. Va.; died October 2; age 87.

Wyman, Webb W., Washington, D.C.; George Washington University Dental Department, 1917; died January 23; age 66.

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Announcements

MEETINGS OF THE AMERICAN DENTAL ASSOCIATION

Ninety-Ninth Annual Session	Nov. 10-13, 1958	Dallas, Texas
One-Hundredth Annual Session	Sept. 14-18, 1959	New York
One-Hundred and First Annual Session	Oct. 17-20, 1960	Los Angeles
One-Hundred and Second Annual Session	Oct. 16-19, 1961	Philadelphia

MEETINGS OF CONSTITUENT SOCIETIES

State	Date	Place	Secretary	Address
Alabama			C. R. Crook	Professional Center, Montgomery
Alaska	June 3-6	Palmer	C. L. Polley	Box 1896, Juneau
Arizona			W. G. Burke	15 E. Monroe St., Phoenix
Arkansas			D. M. Hamm	Box 89, Clarksville
California			W. J. Healy	450 Sutter St., San Francisco
S. California			S. M. Silverman	903 Crenshaw Blvd., Los Angeles 19
Colorado	Oct. 5-8	Colorado Springs	G. H. Jackson	724 Republic Bldg., Denver
Connecticut	May 14, 15	Hartford	E. S. Arnold	37 Linnard Rd., W. Hartford
Delaware			A. G. Schick	3716 Philadelphia Pike, Claymont
District of Columbia	Mar. 15-18, 1959	Washington	J. F. Keaveny	1029 Vermont Ave., N.W., Washington
Florida	May 18-21	Miami Beach	G. J. Perdigon	17 Davis Blvd., Tampa
Georgia	Oct. 12-15	Atlanta	F. M. Butler, Jr.	Bankers Insurance Bldg., Macon
Hawaii	June 15-19	Honolulu	J. H. Dawe	810 N. Vineyard St., Honolulu
Idaho	June 16-18	McCall	G. L. Williamson	1003½ Main St., Boise
Illinois	May 11-14	Springfield	P. W. Clopper	632 Jefferson Bldg., Peoria
Indiana	May 19-21	Indianapolis	W. R. Shoemaker	Citizens Bank Bldg., Anderson
Iowa	May 5-7	Des Moines	H. I. Wilson	Insurance Exchange Bldg., Des Moines
Kansas	May 5-8	Kansas City, Mo.	F. A. Richmond	Brotherhood Bldg., Kansas City 1
Kentucky	Apr. 5-8, 1959	Louisville	A. B. Coxwell, Jr.	2208 Dundee Rd., Louisville 5
Louisiana			J. S. Bernhard	2515 Line Ave., Shreveport
Maine	June 19-21	Rockland	S. M. Gower	Box 27, Skowhegan
Maryland	May 4-7	Baltimore	C. L. Inman, Jr.	Medical Arts Bldg., Baltimore
Massachusetts	May 4-7	Boston	H. E. Tingley	12 Bay State Rd., Boston 15
Michigan			F. Wertheimer	Michigan Dept. of Health, Lansing
Minnesota	Apr. 13-15, 1959	Minneapolis	C. V. E. Cassel	2236 Marshall Ave., St. Paul 4
Mississippi	June 9-11	Biloxi	B. A. Cohen	500-E E. Woodrow Wilson Dr., Jackson 27
Missouri	May 4-8	Kansas City	E. D. Suggett	Merchants Bank Bldg., Jefferson City
Montana	May 1-3	Butte	R. C. Ritter	28 N. Black St., Bozeman
Nebraska			F. A. Pierson	Federal Securities Bldg., Lincoln
Nevada	June 12-15	Lake Tahoe	O. M. Seifert	755 Ryland Ave., Reno
New Hampshire	June 22-24	Whitefield	F. E. Williams	814 Elm St., Manchester
New Jersey	May 18-21	Atlantic City	J. G. Carr	407 Cooper St., Camden
New Mexico	May 25-28	Las Cruces	J. S. Eilar	7 Medical Arts Sq., N.E., Albuquerque
New York	May 12-14	Buffalo	C. A. Wilkie	1 Hanson Pl., Brooklyn 17
North Carolina	May 4-7	Pinehurst	L. H. Butler	Jefferson Bldg., Greensboro
North Dakota	May 4-7	Bismarck	J. H. Pfister	419½ Dakota Ave., Wahpeton

State	Date	Place	Secretary	Address
Ohio	Sept. 28-Oct. 1	Cincinnati	E. G. Jones	185 E. State St., Columbus
Oklahoma			L. D. Wright	Osler Bldg., Oklahoma City
Oregon	Mar. 2-4, 1959	Portland	T. D. Holder	Selling Bldg., Portland
Panama Canal Zone			W. R. Bond, Jr.	U.S.A., Ft. Kobbe Dental Clinic, Ft. Kobbe
Pennsylvania	May 21-23	Harrisburg	M. D. Zimmerman	217 State St., Harrisburg
Puerto Rico	Jan. 1959	San Juan	J. E. Munoz	Loiza and Del Rio Sts., San Juan
Rhode Island	Jan. 20, 21, 1959	Providence	H. A. McGuirl	Union Trust Bldg., Providence
South Carolina	May 25-27	Myrtle Beach	J. E. Wallace	1506 Gregg St., Columbia
South Dakota	May 11-13	Mitchell	R. E. Decker	Box 308, Parker
Tennessee	May 12-15	Chattanooga	K. P. Ezell	116 N. Academy, Murfreesboro
Texas	May 3-6 1959	San Antonio		
Utah	May 22-24	Salt Lake City	R. C. Dalgleish	State Capitol Bldg., Salt Lake City
Vermont	June 27-29	Manchester	E. H. Van Santvoord	22 Washington St., Rutland
Virginia	May 4-7	Richmond	W. T. McAfee	Colonial National Bank Bldg., Roanoke
Washington	April 6-8, 1959	Seattle	G. D. Dore	211 Medical Dental Bldg., Seattle 1
West Virginia	July 20-23	White Sulphur Springs	G. N. Casto, Jr.	710½ Lee St., Charleston
Wisconsin			H. O. Hoppe	1331 W. Vliet St., Milwaukee
Wyoming	June 19-21	Casper	T. J. Drew	State Office Bldg., Cheyenne

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	Date	Place	Secretary	Address
Alabama	June 22-27* June 23, 24	Birmingham	W. L. McCarty	Professional Center, Montgomery
Alaska	July 8-11* July 8, 9†	Anchorage	R. H. Williams	Box 2122, Juneau
Arizona	June 23-30	Florence	W. G. Biddulph	1502 W. Osborn Rd., Phoenix
Arkansas	June 16-20	Little Rock	W. T. Jones	107 E. Shelton, Monticello
California	June 16 June 23	San Francisco Los Angeles	D. R. Grant	507 Polk St., San Francisco
Colorado	June 22-28	Denver	R. F. Gilmore	Republic Bldg., Denver 2
Connecticut	June 23-25* June 27, 28* June 26† June 27, 28†	Boston Bridgeport Bridgeport Bridgeport	C. G. Brooks	302 State St., New London
Delaware	June 30*† July 1-3*†	Philadelphia Wilmington	P. K. Musselman	143 W. Main St., Newark
District of Columbia			W. T. Birthright	1835 Eye St., N.W., Washington
Florida	July 6-17* July 7, 8†	Jacksonville	R. P. Taylor, Jr.	P. O. Box 2913, Jacksonville 3
Georgia	June 9-11	Atlanta	W. G. Brown	Blackshear
Hawaii	Aug. 28-Sept. 1‡		J. Y. Ing	James Campbell Bldg., Honolulu
Idaho	June 23-25	Boise	A. G. DeWinter	Sun Bldg., Boise
Illinois	June 24-27	Chicago	W. A. McKee	Wood Bldg., Benton
Indiana	June 10-13*†	Indianapolis	C. A. Frech	Gary National Bank Bldg., Gary
Iowa	June 2-6*†	Iowa City	P. A. Hahn	Farmers & Merchants Bank Bldg., Burlington
Kansas	June 2-5	Kansas City, Mo.	G. L. Teall	Box 71, Hiawatha
Kentucky	June 9-12*†	Louisville	J. J. Kelly	102 W. Madison St., Franklin
Louisiana	June 2-7	New Orleans	R. C. Steib	Maison Blanche Bldg., New Orleans
Maine			A. S. Appleby	Box 260, Skowhegan
Maryland	June 9-11‡		W. D. Burton	829 Park Ave., Baltimore 1
Massachusetts	June 9-13*‡ June 12, 13†‡		C. R. Williams	70 Washington St., Salem
Michigan	June 8-14		J. L. Champagne	3714 W. McNichols Rd., Detroit 21
Minnesota	June 16-20* June 16, 17†	Minneapolis	E. A. Nelson	2236 Marshall Ave., St. Paul 4 W
Mississippi	June 17-19*†	Jackson	A. H. Richter, Jr.	Aven Bldg., Greenwood
Missouri	June 9-11, 16, 17* June 12-14, 16-17*	Kansas City St. Louis	R. R. Rhoades	Central Trust Bldg., Jefferson City

State	Date	Place	Secretary	Address
Montana	July 14-17‡		R. O. Betzner	303 Power Block, Helena
Nebraska	June 5-11	Lincoln	H. E. Weber	Stuart Bldg., Lincoln
Nevada	June 16	Reno	R. Whitehead	40 W. First St., Reno
New Hampshire	June 19, 20*	Boston	S. G. Markos	8 Renaud Ave., Dover
	June 19†			
New Jersey	June 5, 6*	New York	C. J. Schweikhardt	150 E. State St., Trenton 8
	June 9, 10*	Philadelphia		
	June 13, 14*	Trenton		
	June 18†	Teaneck		
	June 23, 24*	Philadelphia		
New Mexico	June 23-26	Santa Fe	J. J. Clarke, Sr.	Artesia
New York	June 19, 24, 25†‡		D. W. Beier	23 S. Pearl St., Albany 7
	June 19, 20, 24-27*‡			
	Dec. 2-5, 8, 9*‡			
North Carolina	June 23*†	Chapel Hill	J. H. Guion	Doctors Bldg., Charlotte 7
North Dakota	July 7-11	Fargo	G. F. Wirtz	Clinic Bldg., Mandan
Ohio	June 12-14*	Cleveland	D. E. Bowers	322 E. State St., Columbus 15
	June 18-20*	Columbus		
	June 21-25*	Columbus		
	June 21†	Columbus		
Oklahoma	June 23-25*	Oklahoma City	W. H. Stephens	Plaza Court Bldg., Oklahoma City
	June 23, 25†			
Oregon	June 9-12	Portland	F. L. Utter	Pioneer Trust Bldg., Salem
Pennsylvania	May 26-28*†	Pittsburgh	R. E. V. Miller, Sr.	Dept. of Public Instruction, Box 911, Harrisburg
	June 5-7*†	Philadelphia		
	June 16, 17*†	Philadelphia and Pittsburgh		
	June 18-20*†	Philadelphia		
Puerto Rico			J. Mercado C.	Comercio St. #452, San Juan
Rhode Island			F. M. Hackett	267 Academy Ave., Providence
South Carolina	June 19-21‡		W. J. Brockington	1508 Washington St., Columbia 1
South Dakota	June 22-25*†	Sioux Falls	H. T. Aker	Canton
Tennessee	June 9-13	Memphis	C. R. Aita	Bennie-Dillon Bldg., Nashville
Texas	June 7-13*	Dallas	R. T. Weber	Capital National Bank Bldg., Austin 16
	June 7-9†			
Utah	June 23-28‡		M. T. Rigby	47 E. Center St., Midvale
Vermont	June 23-25*†	Burlington	P. M. Fitch	Newport
Virginia			J. M. Hughes	Medical Arts Bldg., Richmond
Washington			F. S. Rotchford	1108 S. Washington St., Olympia
West Virginia	June 23-25	West Liberty	C. C. Cottrill	Box 111, Glen Rogers
Wisconsin	June 9-13*†	Milwaukee	S. F. Donovan	Tomah
Wyoming	June 23-25*†‡		E. E. Edwards	Bank of Commerce Bldg., Sheridan

Most states require applications to be in 30 days prior to examination date.
*Dental examination. †Dental hygiene examination. ‡Write to secretary of dental examining board for information on locations of examinations.

MEETINGS OF OTHER ORGANIZATIONS

Name	Date	Place	Secy. or Chm.	Address
Academy of Denture Prosthetics	May 5-9	Detroit	W. L. Warburton Secy.	Medical Arts Bldg., Salt Lake City 11
American Academy of Dental Medicine	May 29-31	Montreal, Canada	G. J. Witkin Secy.	45 S. Broadway, Yonkers, 2 N.Y.
American Academy of Gold Foil Operators	Nov. 7, 8	Dallas	C. C. Latham Secy.	1125 Tenth St., Coronado, Calif.
American Academy of the History of Dentistry	Nov. 7	Dallas	M. B. Asbell Secy.	25 Haddon Ave., Camden, N.J.
American Academy of Implant Dentures	Nov. 7-9	Dallas	A. N. Cranin Secy.	2120 Ocean Ave., Brooklyn 29
American Academy of Oral Roentgenology	Nov. 7, 8	Dallas	T. S. Grant Secy.	508 16th St., Oakland, Calif.
American Academy of Pedodontics	Aug. 28-30	St. Louis	W. E. Cody Secy.	1325 E. 16th Ave., Denver
American Academy of Periodontology	Nov. 6-8	Dallas	C. E. Chamberlain Secy.	1101 N. North St., Peoria, Ill.
American Association of Dental Editors	Nov. 9	Dallas	A. H. Kutscher Secy.	400 N. 8th Ave., Highland Park, N.J.
American Association of Dental Examiners	Nov. 7, 8	Dallas	C. A. Bumstead Secy.	Stuart Bldg., Lincoln, Neb.
American Association of Dental Schools	Nov. 9	Dallas	M. W. McCrea Secy.	School of Dentistry, University of Minnesota, 127 Owre Hall, Minneapolis

Name	Date	Place	Secy. or Chm.	Address
American Association of Public Health Dentists	Nov. 8	Dallas	P. Ayres Secy.	Box 2591, Jefferson County Dept. of Health, Birmingham, Ala.
American Board of Dental Public Health	Nov. 6, 7	Dallas	C. V. Tossy Secy.	Michigan Dept. of Health, Lansing, Mich.
American Board of Pedodontics	July 29-31	Indianapolis	R. L. Ireland Secy.	College of Dentistry, University of Nebraska, Lincoln 8, Neb.
American College of Dentists	Nov. 9	Dallas	O. W. Brandhorst Secy.	4221 Lindell Blvd., St. Louis
American Dental Assistants Association	Nov. 10-13	Dallas	M. L. Martin Exec. Secy.	First National Bank Bldg., La Porte, Ind.
American Dental Assistants Certification Board	May 3 Oct. 8		F. Smith	23 W. 33 St., Bayonne, N.J.
American Dental Hygienists' Association	Nov. 10-13	Dallas	M. E. Swanson Exec. Secy.	100 E. Ohio St., Chicago
American Dental Society of Anesthesiology	Nov. 8, 9	Dallas	H. A. Sultz Secy.	249 Linwood Ave., Buffalo
American Dental Society of Europe	July 2-5	Knokke, Belgium	J. P. Molony Secy.	110 Harley St., London W.1, England
American Denture Society	Nov. 7, 8	Dallas	V. L. Steffel Secy.	College of Dentistry, Ohio State University, Columbus, Ohio
American Institute of Dental Medicine	Oct. 12-16	Palm Springs, Calif.	M. Lewis Exec. Secy.	2240 Channing Way, Berkeley 4, Calif.
American Society of Dentistry for Children	Nov. 7-9	Dallas	R. E. McDonald Secy.	School of Dentistry, Indiana University, 1121 W. Michigan St., Indianapolis
American Society of Oral Surgeons	July 30–Aug. 2	Chicago	A. B. Coxwell Exec. Secy.	2208 Dundee Rd., Louisville 5, Ky.
Ark-La-Tex Dental Congress	Aug. 18	Shreveport, La.	J. Wyrick Secy.	Texarkana National Bank, Texarkana, Texas
Arpa Internationale, Twenty-fifth Congress	July 7-12	Paris, France	A. J. Held Pres.	Institute Universitaire de Medecine Dentaire, 24 rue Micheli-du-Crest, Geneva, Switzerland
Association of American Women Dentists	Nov. 10	Dallas	M. B. McCann Secy.	2600 N. McCullough, San Antonio, Texas
Austrian Dental Association	Sept. 18-21	Salzburg, Austria	K. Czerwenka	Franz Josef Strasse 12, Salzburg, Austria
Berkshire Conference (Ninth)	June 15-19	Lenox, Mass.	I. Glickman Dir.	Tufts University, School of Dental Medicine, 136 Harrison Ave., Boston 11
British Columbia Dental Association	May 1-3	Vancouver	I. U. MacIntosh Secy.	624 Sixth St., New Westminster, B.C., Canada
British Dental Association	July 7-12	Dundee, Scotland	H. P. Buchanan Secy.	13 Hill St., Berkeley Square, London W.1, England
Canadian Dental Association	Oct. 26-29	Montreal	D. W. Gullett Secy.	234 St. George St., Toronto 5, Canada
Chicago Dental Society	Feb. 8-11, 1959	Chicago	K. S. Richardson Exec. Secy.	30 N. Michigan Ave., Chicago
Council on Dental Education, Dental Aptitude Tests	Oct. 3, 4		S. Peterson Secy.	222 E. Superior St., Chicago 11
Cuban National Dental Congress (Fifth)	Nov. 14-17	Havana	C. Funcia C.	No. 353, Vedado, Havana, Cuba
Endodontics, Second International Conference	June 22-28	Philadelphia	M. Kolb Secy.	4001 Spruce St., Philadelphia 4
European Organization for Research on Fluorine and Dental Caries Prevention, Fifth Congress	May 30-June 1	Brussels, Belgium	A. Syrrist Secy. Gen.	Ecole Dentaire Royale, Malmo, Sweden
European Orthodontic Society	July 4-8	Copenhagen, Denmark	A. Bjork	Royal Dental College, 4, Universitetsparken, Copenhagen, Denmark
Federation Dentaire Internationale, 46th Annual Meeting	Aug. 27-Sept. 3	Brussels, Belgium	G. H. Leatherman Secy.	35 Devonshire Pl., London W.1, England
Greater New York Dental Meeting (Thirty-fourth)	Dec. 8-12	New York	M. Purdy Exec. Secy.	Statler Hotel, New York 1
International College of Dentists	Nov. 9	Dallas	H. O. Westerdahl Secy.	4829 Minnetonka Blvd., Minneapolis

Name	Date	Place	Secy. or Chm.	Address
Mid-Continent Dental Congress	Oct. 12-15	St. Louis	J. E. Brophy Exec. Secy.	8013 Maryland Ave., Clayton 5, Mo.
National Association of Seventh Day Adventist Dentists	Nov. 7-9	Dallas	G. H. Curtis Secy.	Medical College of Evangelists, Dental School, Loma Linda, Calif.
National Board of Dental Examiners	Dec. 1, 2		G. J. Casey Secy.	222 E. Superior St., Chicago 11
National Dental Association, Inc.	Aug. 3-7	Pittsburgh	E. N. Jackson Secy.	P. O. Box 197, Charlottesville, Va.
New Orleans Dental Conference (Eleventh)	Nov. 23-26	New Orleans	A. A. Copping Secy.	4704 Paris Ave., New Orleans
Northern Brazil, First Congress	July 7-12	Macapa	J. M. Lima Gen. Secy.	Central Committee on Organization, First Congresso Nortista de Odontologia, Macapa, Amapa, Brazil
Odontological Federation of Central America and Panama, Second International Convention	Nov. 26-29	San Jose, Costa Rica	R. Chartier Chm.	P.O. Box 698, San Jose, Costa Rica, C.A.
Odontological Society of Western Pennsylvania	Sept. 30-Oct. 2	Pittsburgh	H. D. Butts, Jr. Secy.	Jenkins Bldg., Pittsburgh 22
Pan-American Dental Congress	Nov. 18-22	Mexico City, Mexico	Secretary	Asociacion Dental Mexicana Sinaloa 9, Mexico 7, D.F., Mexico
Society Suisse d'Odontologie, Annual Congress	May 8-11	Geneva, Switzerland	Secretary, S.S.O.	Spitalgasse 37, Bern, Switzerland
Southeastern Society of Oral Surgeons	May 2, 3	Daytona Beach, Fla.	P. B. Whittington, Jr. Secy.	Medical Arts Bldg., Greensboro, N.C.
Southwest Society of Periodontists	May 3, 4	Waco, Texas	J. H. Swindle, Jr. Secy.	P. O. Box 3096, Westview Station Waco, Texas

CLASSIFIED ADVERTISING

Forms close on 20th of second month preceding month of issue

Remittance Must Accompany Classified Ads.

Classified advertising rates are as follows:
30 words or less—per insertion.....$6.00
Additional words, each..... .15
Answers sent c/o American Dental Association .....no extra charge
Replies to A.D.A. box number ads should be addressed as follows:
American Dental Association
222 E. Superior Street
Chicago 11, Ill. Box.....
Please be sure that the box number appears on the envelope.

PRACTICES AND OFFICES FOR SALE AND/OR RENT

BARBADOS, BRITISH WEST INDIES—For health reasons, must sell. Attractive for semi-retired person or one needing warm, healthy climate all year. Price: $12,000, rent $30 monthly; nurse $10 weekly; technician $12 weekly. Equipment, old Ritter, instrument case, new x-ray, full laboratory. Easily make $12,000 yearly. American or Canadian diplomas accepted. Write to Dr. Barbara Lloyd-Still, 2016 Plantations Bldg., Bridgetown, B.W.I.

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CALIFORNIA—Fast growing coastal town, no dentist, needs one! Excellent schools, fishing and hunting area, ideal climate. Five-room suite in center of town now available. Address A.D.A. Box No. 931.

•

CALIFORNIA—Orthodontist — design your own suite in dental building to be constructed in suburban Los Angeles. Building will feature garden suites, air conditioning and free off-street parking for doctor and patients. No orthodontist within five miles. Address A.D.A. Box No. 700.

•

CALIFORNIA—San Francisco Bay area. For lease, reasonable. The only five room dental suite in new medical-dental building in shopping center. Write to Dr. H. Pepper, 50 Edgewood Rd., Redwood City, Calif.

•

COLORADO—For sale. $55,000 a year practice. Lovely new six room office building with two fully equipped operating rooms. Rapidly growing town; population 10,000; mountains; splendid climate; excellent hunting and trout fishing. Dentist leaving to specialize. Equipment and practice must be sold; will sell or lease building; $10,000 cash required. Address A.D.A. Box No. 842.

•

COLORADO—For sale. Practice and equipment. Retiring immediately from practice in downtown Denver's Republic Bldg. Reasonable. Address Dr. John H. Baker, 1202 S. Race St., Denver, Colo.

•

CONNECTICUT—For sale. Active dental practice, two-chair office in busy industrial Connecticut city, modern, air conditioned. Grossing about $30,000; ideal opportunity for prosperous practice; leaving state. Address A.D.A. Box No. 932.

CONNECTICUT—For sale. Three-chair modern, general practice dental office in air-conditioned building. $15,000; terms. Dentist, age 47, will stay with buyer for six months and share expenses, refer patients and then retire to Florida. Address A.D.A. Box No. 534.

•

CONNECTICUT—For sale. Two-chair fully equipped office, modern Ritter and S. S. White, in air-conditioned building; growing practice grossing over $20,000. Above average clientele in well established residential town. Address A.D.A. Box No. 864.

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FLORIDA—Suburb of Miami. Retiring, two-chair, air-conditioned office can be had with small capital outlay. Address A.D.A. Box No. 933.

•

FLORIDA—For rent. Five room professional office in St. Petersburg located in a modern building in an excellent location. Present occupant moving to larger quarters. Space will be available about May 1. For further information write P. O. Box 11361, St. Petersburg, Fla.

•

ILLINOIS—For sale. Middle eastern Illinois town of 50,000; one-chair office and all equipment new in last five years; high speed equipment. Air conditioned. Downtown location. Returning to specialize, will introduce. Address A.D.A. Box No. 934.

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ILLINOIS—For sale. Well established dental practice in northern Illinois. Four-chair operating rooms and x-ray; excellent downtown location; wide surrounding area dependent on dentist here. Excellent opportunity. Address A.D.A. Box No. 935.

•

IOWA—For sale. Attractive two-chair office. Very active practice in pleasant southern Iowa town; population 6,000. Address A.D.A. Box No. 905.

•

KANSAS—For sale. Practice grossing $40,000 in large city in Kansas, built over nine year period. Will sell all or part of equipment four years old. Lease is reasonable; excellent location near large hospital. Address A.D.A. Box No. 936.

•

MARYLAND—For sale or lease. Established modern dental office, latest equipment, excellent location. Call or write Erwin Ira Ulman, Attorney, 1811 Munsey Bldg., Baltimore 2, Md. SAratoga 7-0397.

MICHIGAN—Modern two-chair active dental practice for sale, rent or lease in Kalamazoo. Located in a modern ranch type building; air conditioned. Dentist leaving to specialize. Address A.D.A. Box No. 937.

•

MICHIGAN—For sale. Northwestern section, lower peninsula. Attractive brick and stone modern one-story dental building at present occupied by physician. Room for combined offices or living quarters. Excellent opportunity. Address A.D.A. Box No. 822.

•

NEW JERSEY—For sale. Fully Ritter equipped office in growing northern New Jersey, suburb of New York City. Lucrative general practice. Dentist wishes to retire. Terms. Address A.D.A. Box No. 938.

•

NEW JERSEY—Bergen County. For sale. Beautiful two-chair dental office; large laboratory and waiting room; gross $30,000; a good man definitely can do better; have other interests; reasonable. Address A.D.A. Box No. 906.

•

NEW JERSEY—For sale. Active practice, equipment and office consisting of three modern operating rooms, receptionist's office, private office, reception room, etc. Centrally air conditioned. Five room apartment above office. Leaving to specialize. Dr. Carl E. Housekeeper, 216 S. Main St., Pleasantville, N. J.

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NEW JERSEY—Vailsburg. For sale. 670 Sanford Ave., former physician's corner brick home and office. Two-car garage; excellent location. Mortgage available; priced at $19,000. Call ES 3-3456.

•

NEW YORK—For sale. Bronx office and home, two-family brick dwelling consisting of two-car garage, one six room apartment, one three room apartment (occupied by owner) and one three room, two-chair dental office and laboratory; fully furnished and equipped. Half block from Jerome Ave. station. Practice established since 1922. $29,500; terms. For further details write Box 70, Morris Heights Station, Bronx 53, N. Y.

•

NEW YORK—New York City, the Medical Arts Center, 57 W. 57th. Two operating rooms, business office. Share waiting room, laboratory, etc. All services with-without equipment; with-without lease; full or part time. New office, general practitioner or specialty. Address A.D.A. Box No. 939.

•

OHIO—For sale. Excellent opportunity, two-chair office fully equipped with exception of one operating room. Located in southern Ohio college town with large drawing area. Priced right. Address A.D.A. Box No. 910.

•

OHIO—Attention June graduates. Available September, fully equipped, air-conditioned one-chair office for sale in Akron. Second operatory is fully wired and plumbed. Ground floor. Practice established three years; leaving to specialize. Address A.D.A. Box No. 909.

PENNSYLVANIA — Excellent opportunity. Optometrist wishes to share air-conditioned office in Harrisburg's largest shopping center; 240 sq. ft. (20'x27'), water available, low overhead, new neighborhood. M. Sasson. O.D. 41 Kline Village. Telephone Cedar 6-0865.

•

PENNSYLVANIA—For sale. Active practice established 15 years. Three-bedroom home. Newly equipped (Ritter), modern air-conditioned office. Best location on main street of Philadelphia suburb, Delaware County. Owner entering specialty; will introduce patients. Immediate income assured. Approximately $6,000 cash outlay required. Address A.D.A. Box No. 940.

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PENNSYLVANIA—Levittown. For sale. Fully equipped modern ranch type dental office with adjoining income-producing three room apartment. Must sacrifice. Going into specialty. Write to P. O. Box 55, Penndel, Pa.

•

PENNSYLVANIA—For sale. Southern Chester county, well established quality practice. Relocating for personal reasons. Area badly needs practitioner. Newly built paneled office suite with or without equipment. Large extensively remodeled home on well landscaped corner lot, small town near many large industries. Address A.D.A. Box No. 941.

•

PENNSYLVANIA—Modern, paneled home-office combination, suburban, seven (7) miles south of Philadelphia; sale with or without property, netting $14,000 year, can double. Main street with bus stop. Address A.D.A. Box No. 942.

•

PENNSYLVANIA—Lancaster. Excellent opportunity for young dentist; landlord will remodel to suit tenant; modern professional office building, ideal location, plenty of free parking for patients' convenience. Lease to suit tenant. James W. Wentz, Realtor, 573 New Holland Ave., Lancaster, Pa. Phone EXpress 4-4084.

•

TENNESSEE—For sale. Modern two-chair office, complete, two x-ray units. In service. Contact Dr. H. A. Akin, Paris, Tenn.

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VIRGINIA—For sale. Complete dental office and equipment including x-ray $3,000. If desired, may rent present modern, knotty pine paneled office. Parking space. Reasonable rent. Mrs. Cleo Y. Adkerson, 404 Oliver, St. Fairfax, Va.

•

VIRGINIA—Excellent location for dentist associated with physician. Office is ready for occupancy. Apply to Wm. C. Gleason, Jr., 359 Broad St., Portsmouth, Va.

•

WASHINGTON—For sale. Modern two-chair dental office and home. Ideal for young dentist to get started in fast growing eastern Washington area. Will finance. Owner leaving state. Address A.D.A. Box No. 912.

OPPORTUNITIES AVAILABLE

CALIFORNIA—Qualified orthodontist for group dental practice, full or part-time. Experience preferable. California license. Address A.D.A. Box No. 943.

•

CONNECTICUT—General practitioner with high volume children's practice seeks orthodontist to share office on part-time basis. Near Hartford. Address A.D.A. Box No. 944.

•

GEORGIA—Atlanta. Wanted associate for general dentistry in modern, completely equipped clinic. Four chairs. Percentage basis with opportunity to establish own practice without initial outlay. Reply to 182 Feld Ave., Decatur, Ga.

•

IOWA—Wanted, recent graduate or returning veteran, preferably with experience in surgery, to establish practice in northern Iowa community. Center of rich agriculture area; excellent medical facilities and service, but inadequate dental service. Cooperation of physicians and immediate practice assured. Near resort and fishing areas. Pheasant and deer hunting. Address A.D.A. Box No. 945.

•

KANSAS—Wanted dentist for a three man clinic and hospital group in south central Kansas. Salary plus commission with possible complete ownership of the equipment in the future. For details contact F. W. Schwerin, Achenbach Memorial Hospital, Hardtner, Kan.

•

NEW JERSEY—Wanted full time dentist to associate. Opportunity for permanent well paid position with own practice. Prefer recent graduate (five years or under) with service experience. Give school and year, where from, employment since school and any other helpful information. Address A.D.A. Box No. 946.

•

NEW YORK—Associate wanted in attractive, modern equipped, five chair, middle state office. Medium sized city, excellent clientele. Busy practice, pleasant working atmosphere, unusual opportunity. Give experience, salary expected, age, in reply. Address A.D.A. Box No. 947.

•

NORTH DAKOTA—Excellent opportunity for experienced dentist to join medical group. One year of guaranteed salary, $8,400 plus percentage. Could be at least $13,000 net first year. No starvation period. (Other arrangements can be made.) Modern equipment. Two chairs, laboratory, etc. North Dakota license necessary. Start immediately. (Garrison Reservoir—200 miles of water—within two miles of town. Fishing, boating, etc.) Contact Martin Hochhauser, M.D., Garrison Clinic, Garrison, N. D.

•

WASHINGTON—Foreign missionary work. Excellent opportunity for qualified men in all parts of the world. For details apply to The Missionary Dentist, 5543 25th Ave., N. E., Seattle 5.

OPPORTUNITIES WANTED

California—1955 graduate, licensed, married, age 26, completing military service in September, desires practice or association with ethical dentist in southern California. Address A.D.A. Box No. 948.

•

California licensed dentist wishes to purchase practice and equipment of busy, ethical general dentist or periodontist in southern California. Will associate for introductory period. Address A.D.A. Box No. 949.

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California—Dentist, U. C. graduate wishes location within 100 miles north of San Francisco. Address A.D.A. Box No. 950.

•

Connecticut—Connecticut licensed dentist, Temple University 1956, 29, married, desires practice or association in general practice. Service obligation complete effective June 30, 1958. Address A.D.A. Box No. 951.

•

Florida—Orthodontist desires to purchase association or location for practice. University trained in edgewise, twin arch technic. Age 35, excellent background, military obligation completed. Replies kept in strictest confidence. Address A.D.A. Box No. 960.

•

Florida licensed general practitioner, well qualified, age 41, married, now practicing in midwest, wants to live in Florida and desires pleasant association with congenial, ethical dentist; coastal area preferred but not essential. Address A.D.A. Box No. 878.

•

Florida—1956 graduate, licensed, 27, family, desires association or purchase of established general practice. Military obligation complete in August. Available for interview in June. Address A.D.A. Box No. 952.

•

Illinois—Illinois licensed, Illinois graduate 1956, desires association or association leading to general practice. Chicago or nearby area. Discharge from service August 1958. Address Captain M. Kaplan, 1633 E. Genessee, Syracuse 10, N. Y.

•

Indiana licensed dentist, 27, married, service obligation completed July 1958. Interested in purchasing active practice, leasing medical center space or association leading to eventual partnership or ownership in northern Indiana. Address A.D.A. Box No. 953.

•

Michigan—Detroit. Had internship, graduate school and two years' experience in oral surgery. Pennsylvania Boards only. Desire six months' association with hospital or public clinic from July-December until residency starts. Address A.D.A. Box No. 923.

•

1954 graduate, Michigan, Pennsylvania license, desires association in oral surgery, anesthesia, general practice or teaching. One year oral surgery, one year general anesthesia (hospital and office) training. Will take any Board or move to any country. Military obligation fulfilled, age 29. Address A.D.A. Box No. 954.

Minnesota—1956 graduate, licensed, 27, family. Completing military service July 1958, desires practice or association in established general practice. Prefer Twin Cities vicinity or nearby area. Address A.D.A. Box No. 955.

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Minnesota—District of Columbia-licensed general practitioner, 49, completing military service in August 1958, desires association or employment with ethical practitioner or group, either state. Address A.D.A. Box No. 956.

•

New Jersey—New Jersey licensed dentist, 25, Tufts graduate 1956, will terminate military service in July. Interested in renting or associating in north Jersey. Address A.D.A. Box No. 957.

•

Ohio licensed dentist, National Boards, 28, married, native Clevelander, completing military obligation early August 1958, desires employment, possibly leading to association in general dentistry within greater Cleveland area or vicinity. Experienced in all fields of dentistry; especially fond of children's dentistry. Address A.D.A. Box No. 922.

•

Oregon—Graduate licensed general practitioner arriving Oregon in August desires association with oral surgeon, prosthodontist, group practice or practice for sale. Northwestern Oregon. Write to Dr. Lewis B. Coover, Shelby, Ohio.

•

Oral surgeon, age 29, married. Internship, didactic course, residency. New York and New Jersey licenses; National Boards. Desires association with established oral surgeon or group practice. Will take necessary Boards. Address A.D.A. Box No. 958.

•

New Jersey licensed dentist completing military service July 1958, desires full time association or employment with high type ethical practitioner in Essex, Union, Bergen, Morris or Middlesex county; professional qualifications on request; eventual partnership or purchase not necessary. Address A.D.A. Box No. 959.

•

Ohio—Recent graduate, military service completed, interested in taking over established practice. Prefer city over 30,000. May be interested in group practice or general practice with special attention toward children. Address A.D.A. Box No. 962.

•

Pennsylvania—completing military service May 1958, Pennsylvania licensed, age 30, married; desires association in general dentistry, full or part-time basis. Address A.D.A. Box No. 961.

•

Wanted—Orthodontic preceptorship under a Board Diplomate orthodontist. Age 26, married, military obligation fulfilled. One year general dentistry experience, National Boards and Pennsylvania license. Will take necessary state Boards. Address A.D.A. Box No. 963.

Oral surgeon desires opportunity with established oral surgeon. Three and one-half years of approved training including internship, residency, graduate school, anesthesiology residency and office experience with general anesthesia. Address A.D.A. Box No. 964.

•

Oral surgeon desires association leading to partnership with established oral surgeon or group. Three years' formal training including one year graduate school University of Pennsylvania. Conscientious, military obligation completed. Will invest. Address A.D.A. Box No. 965.

•

Oral surgeon, 30, married, completing training May 1958. Three years' private practice, university graduate training and approved internship and residency including extensive general anesthesia. Military requirements completed. Desires association with individual or group or good location for establishing private practice. Address A.D.A. Box No. 966.

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Pennsylvania—Licensed dentist desires position in hospital, institution, industry or public health program. Military obligations completed. Address A.D.A. Box No. 967.

•

Foreign service—young general practitioner desires position with commercial organization, school, hospital, clinic or government outside continental limits of United States. Veteran, good health, hospital experience. Address A.D.A. Box No. 925.

WANTED TO BUY

Old and used dental books, journals, prints. Leo L. Bruder, 1 DeKalb Ave., Dept. 21, Brooklyn, N. Y. Dealer in out-of-print dental literature.

•

Six used Hanau articulators. Will buy for cash or trade Dudley impactor set, new Ney surveyor or Pelton oil sterilizer. Dr. J. McCarty, 1936 Bay St., Saginaw, Mich.

FOR SALE

For sale. My complete collection of all American Dental Association Journals from January 1927 to present time. Only three issues missing. All in good condition. Address A.D.A. Box No. 968.

•

For sale. New cream white Cavitron ultrasonic unit, latest no-rust nylon paddle, latest handpiece and accessories, not a scratch on unit, 55 brand new assorted points that have never been used. All for $1,000. Address A.D.A. Box No. 969.

•

For sale. Airdent unit, ivory, with arm, four tanks, many tips. Excellent condition. Pittsburgh. Best offer over $550.00. Address A.D.A. Box No. 970.

New, Well-Illustrated Mosby Books that Correlate Concepts and Clinical Care

Orban — Wentz — Everett — Grant
PERIODONTICS — A CONCEPT — THEORY AND PRACTICE

Edited by Balint Orban, M.D., D.D.S. with 3 Co-Editors and 22 Contributors

Scheduled for release late this month, PERIODONTICS—A CONCEPT—THEORY AND PRACTICE is an "atlas-type" presentation of the basic biological concepts in periodontics and the clinical application of them. Edited by Dr. Balint Orban and co-edited and written by 25 eminent clinicians and teachers, this new book skillfully guides you from the diagnosis to the treatment and prognosis. Particularly helpful are the vivid illustrations of actual cases, the discussions of the difficulties you can expect and the ways in which you can overcome these problems. Many clinical procedures are presented, but only in outline form since the purpose of this new book is the understanding of the basic principles. Over 400 vivid illustrations supplement the text and describe some phases of treatment. Completely current, this practical book evaluates recent surgical methods and discusses the problem of occlusion.

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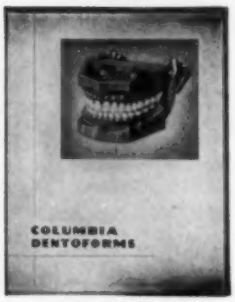

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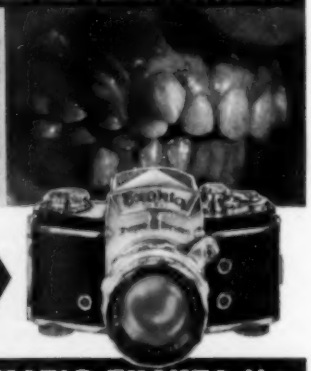

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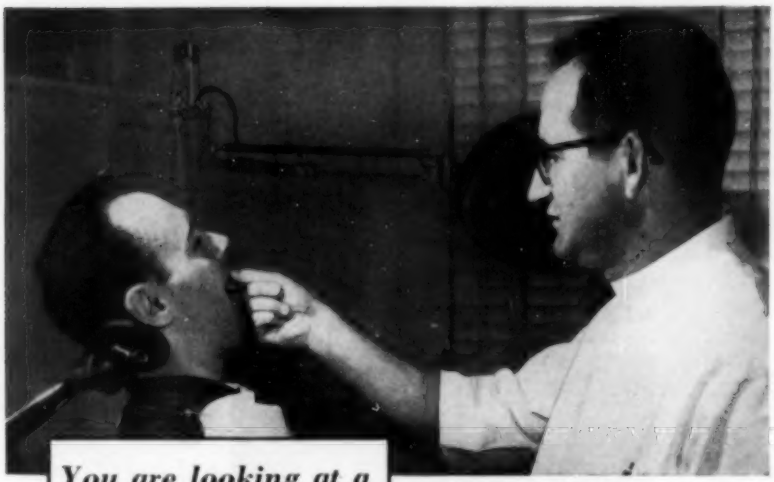

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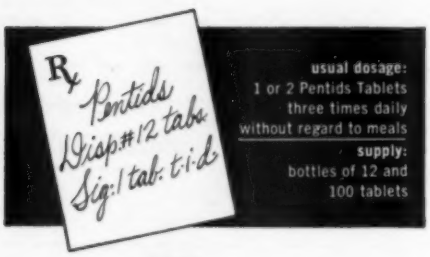

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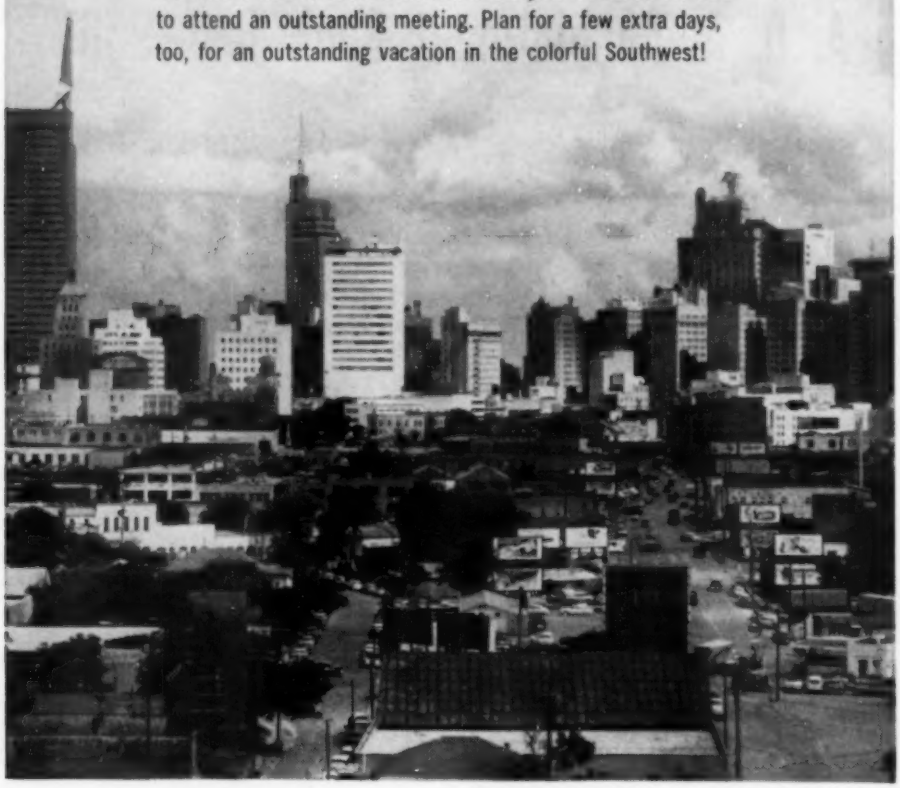

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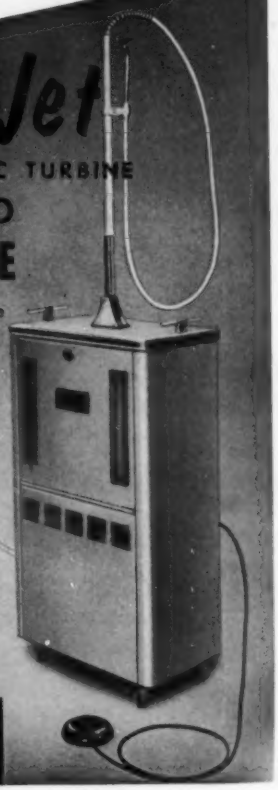

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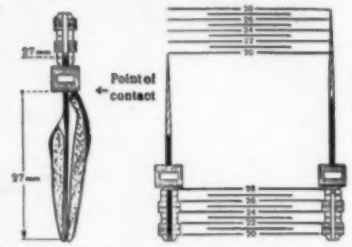

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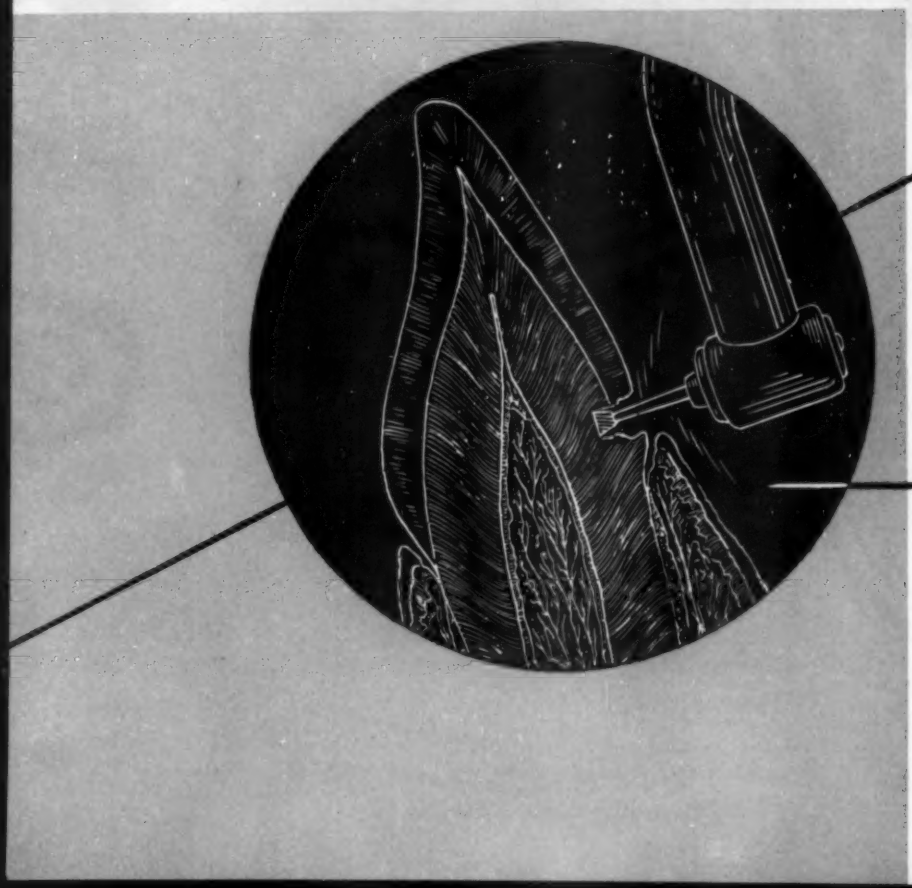

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All plain Burs	1.40	1.26	1.19	1.16
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Plain Burs Nos. 1, 2, 4, 6, 34, 35, 37, 57, 171	1.50	1.35	1.275	1.24
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(3 doz. plain, 1 doz. dentate)
1 plastic block—and
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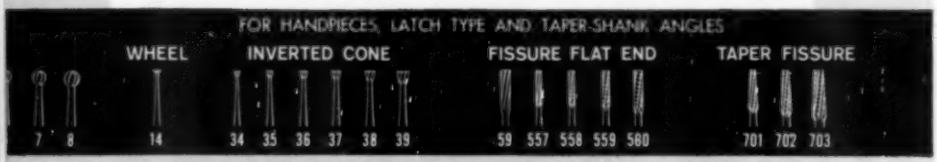

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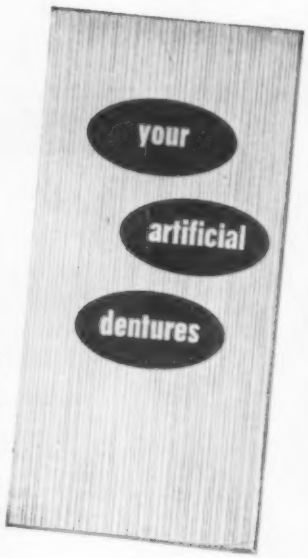

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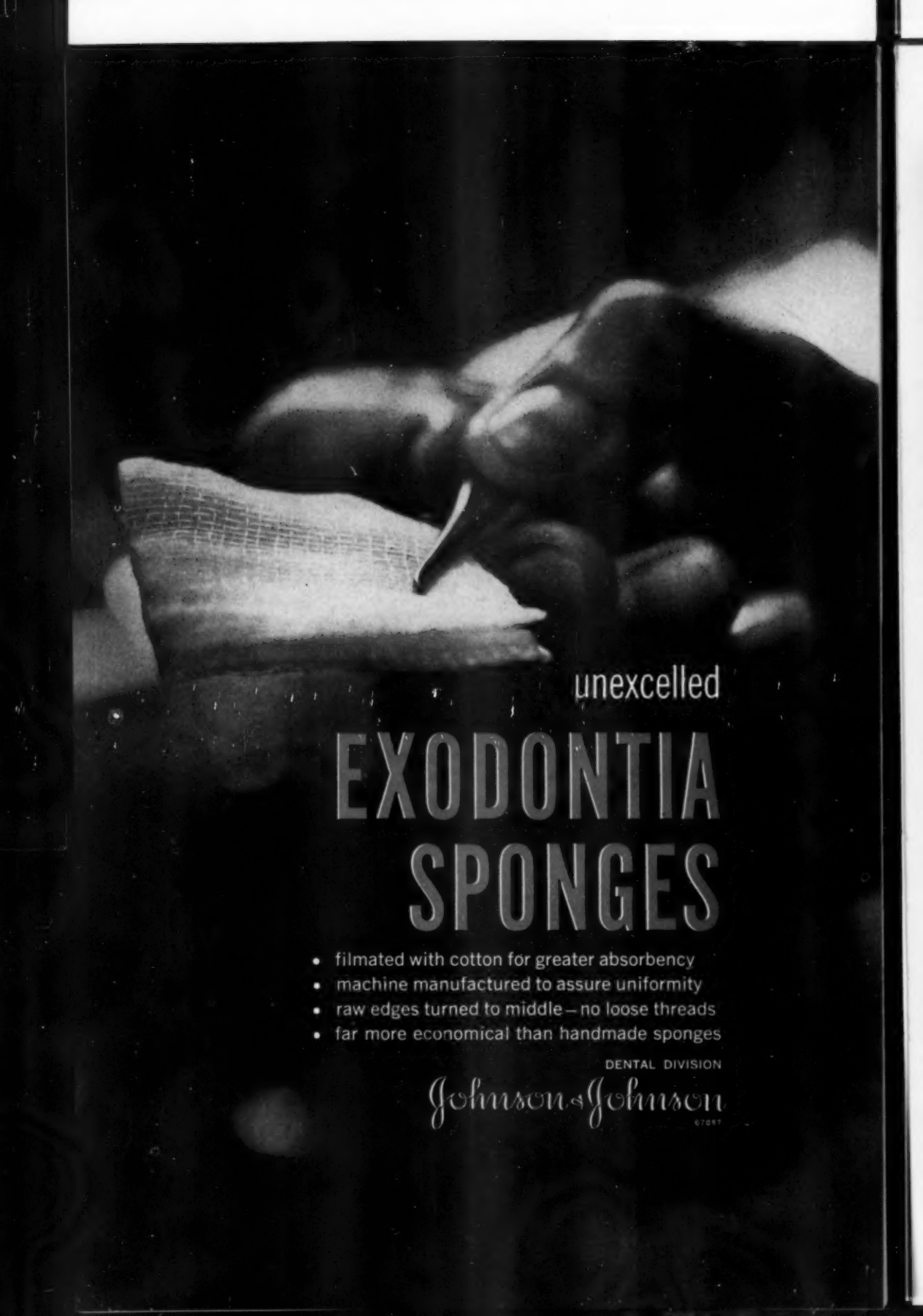
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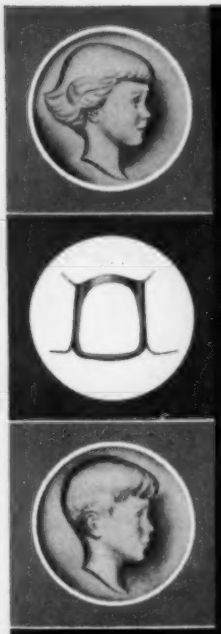

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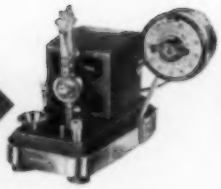

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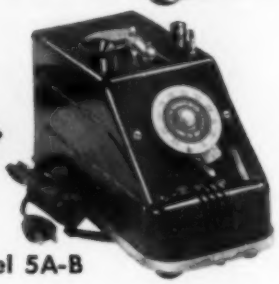

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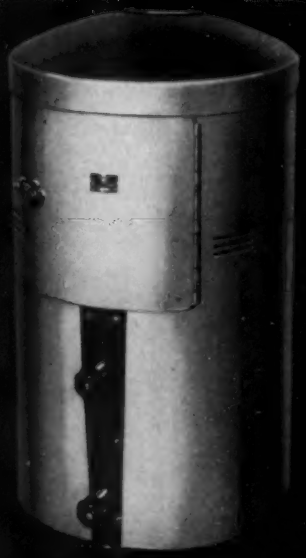

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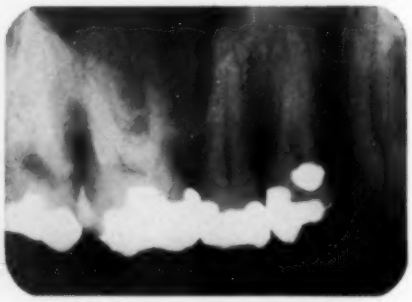

With an error of ¼ second overexposure, developed for only 2½ minutes, film is still clear, diagnostically useful.

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widest exposure and processing latitude!

Du Pont D-1 Dental X-ray Film is a fast, all-purpose periapical film. Its high speed makes it valuable whenever rapid exposures are necessary; its amazing latitude in exposure time and processing helps you get better radiographs . . . means fewer retakes!

For instance, the two radiographs above of upper bicuspids were made on D-1. The one on the left was exposed and processed as recommended. But, the film on the right was subjected to both exposure and processing errors intentionally – yet the two films are very similar and the effects of error in processing and exposure are minimal.

Du Pont Dental X-ray Film offers another way to minimize errors – the "Pull-A-Tab" Packet. This exclusive feature puts an end to fumbling and groping in the darkroom – reduces the chance of processing mistakes.

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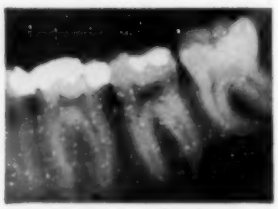

The small white spots all over this radiograph were caused by grains of dried fixer getting on the emulsion before the film was processed. This is a housecleaning problem—to avoid it, be sure to clean the darkroom periodically to keep drops of fixer from drying and forming dust which contaminates the film.

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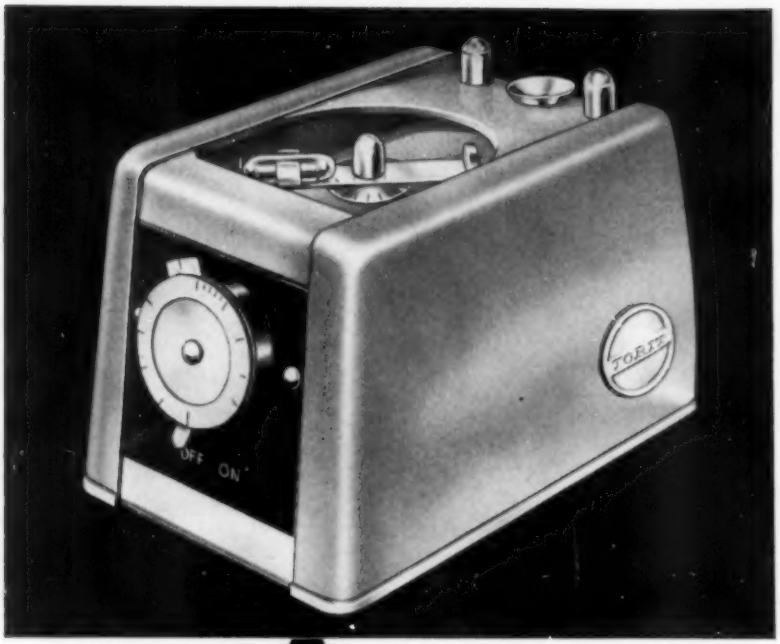

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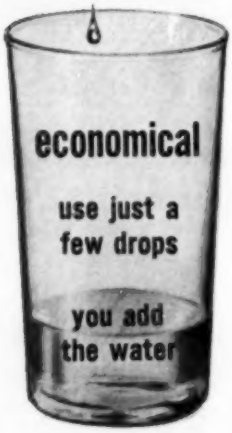

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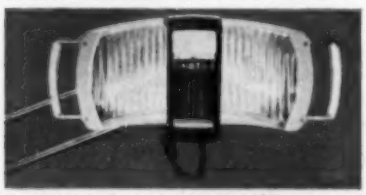

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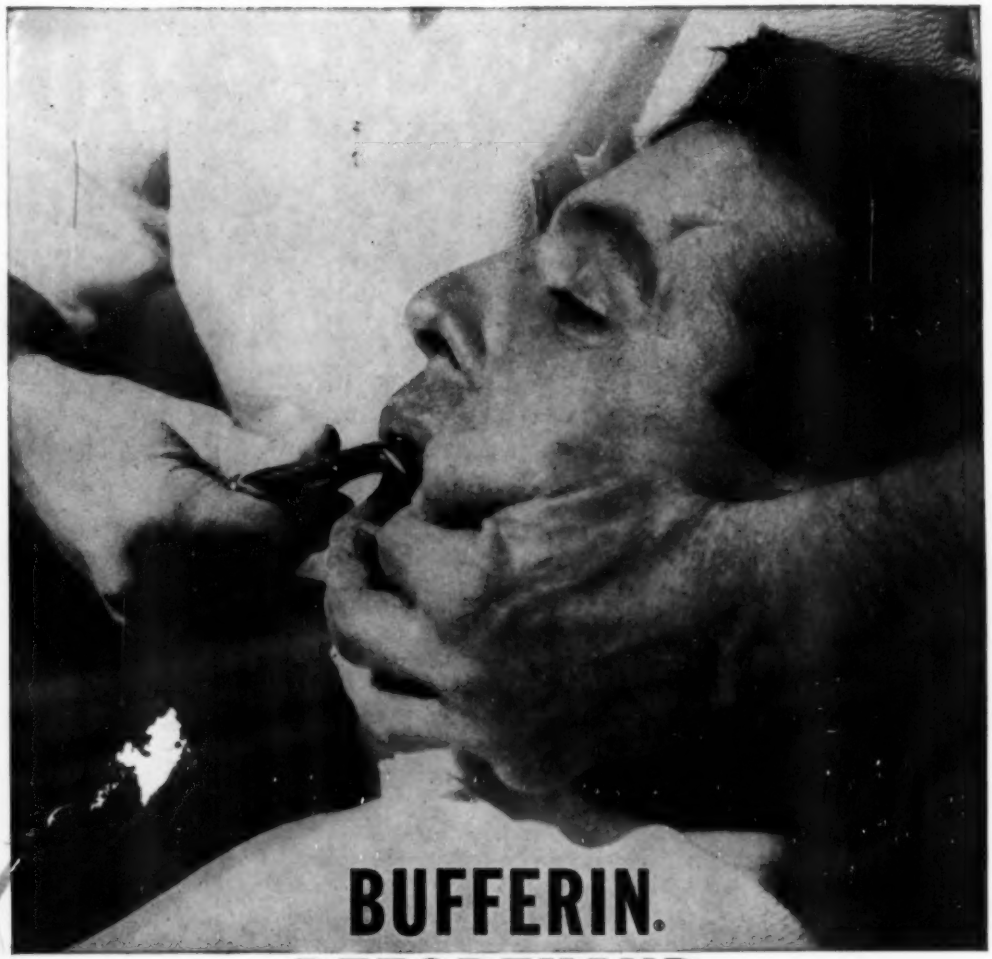

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